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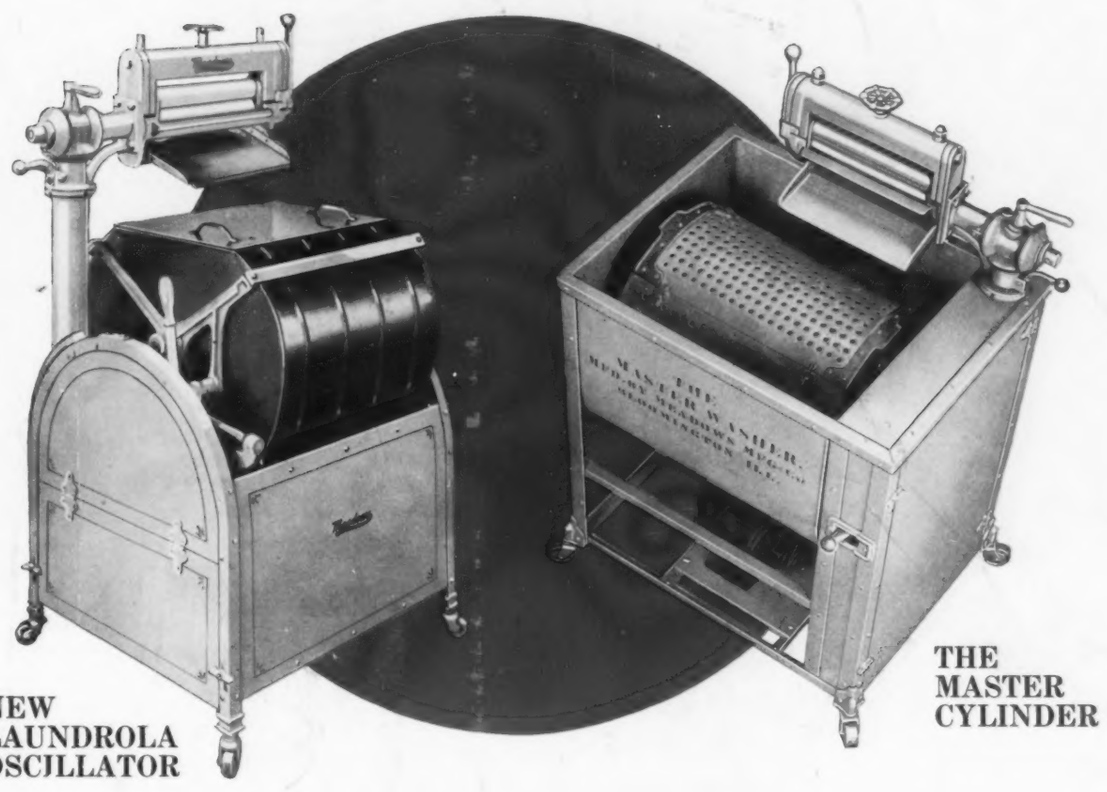
Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES



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IN THE ELEVEN WESTERN STATES

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Transmission-Line Map for 1925

IT is the custom of the Journal of Electricity to issue a transmission-line map of the eleven Western states every two years. This work started back in 1905 when a small map of the transmission lines of California was printed. Five years later the first supplement map of the lines of the Western states was issued. In 1915 this map was corrected and reissued. This was done again in 1920. Since that time the development and extension of the electric service companies have been so rapid that it has been found necessary to issue the map every two years.

The 1925 map will be a supplement to the Feb. 1 issue. Instead of conforming to the old standard size, 20 x 24 in., this year it will be 32 x 40 in. This larger size is necessitated by the congestion in California and other Pacific Coast states where development has been most rapid.

The new map will show among other things all transmission lines in California, Oregon, Washington, Idaho, Montana, Wyoming, Colorado, Utah, Nevada, Arizona and New Mexico. In the case of some of the smaller utilities lines of lower voltage are shown. It likewise shows all hydroelectric and steam generating stations with their capacities. Some of the major undeveloped power sites are also noted.

For use of engineering or other departments of utilities which desire full size prints of the map, the Journal of Electricity is in a position to supply blue prints from the original tracings at the nominal price of $5. This map is 44 x 54 in. Copies may be secured by addressing the San Francisco office, 883 Mission Street.

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EDITORIAL

If Municipal Employees Are Taxed, Then Tax Municipal Corporations

UNCLE SAM has the reputation of being a niggardly paymaster, as everybody knows who has ever had occasion to compare salaries paid in government service with those for corresponding occupations in civil life. The same is true of state and municipal positions, the principle being apparently that to hire more men at lower pay is cheaper than fewer men at higher pay.

Nevertheless, there are many men in the government service who are honest, hard-working and competent, to whom society owes a debt that it can never repay, men who have so conscientious a regard for their work and responsibilities as to be utterly forgetful of self in their devotion to the task before them. This aggravates the injustice of the ruling recently announced by the Commissioner of Internal Revenue to the effect that the pay of employees of the various government-owned and operated power enterprises is subject to income tax because they are engaged in a business competing with private business, and are therefore "quasi-private" in their character.

The exemption of incomes earned in the government service has always been considered as sort of palliative to their admittedly low scale; in fact, it is a definite consideration to those entering the service of the government. Therefore, such a ruling appears as no less than a breach of faith on the part of the government. What aggravates the injustice even further is the additional proviso that the ruling is retroactive, and the unfortunate employees of municipal power projects are in a fair way to bankruptcy at the hands of the very government they have served so conscientiously.

It is hardly necessary to state that we hold no brief for government-owned and operated utilities. On the contrary, we consider such enterprises a menace to the welfare of the American people. Nevertheless, for the unfortunate individuals employed by municipal power projects we have the most sincere sympathy at the predicament in which they find themselves. Undoubtedly there will be found in our halls of Congress men whose sense of justice will compel them to espouse the cause of municipal power project employees and either have the ruling rescinded or readjust the pay scale to equalize the deduction.

A moral lesson is pointed out by this situation. Here we have the spectacle of tax-free securities representing a tax-free enterprise manned by tax-exempt employees in competition with tax-paying private capital, thus placing an unjust burden upon taxpayers outside of this favored circle and creating a fictitious profit that is really a deficit to be made up by taxes on private enterprise.

If it is just and proper to tax the pay of employees of municipal power enterprises, why should not it be equally so to tax the municipal enterprises themselves? Certainly they are competing with private enterprises and are therefore "quasi-private" themselves. We would be interested in hearing from the Commissioner of Internal Revenue on this point, as would also the purchaser of the tax-free bonds who would be in the same position, relatively, as the municipal power company employees. What is sauce for the goose is sauce for the gander.

Earning the Tribute of the Community "We"

A POWER man was listening in on a conversation in the Pullman car. "We don't do that in Walla Walla," he overheard, in reference to some power company practice under criticism by a man from another community; "our policy is somewhat different." And the speaker went on to defend the company most eloquently.

Now, the power man was an official of the utility which served Walla Walla—and yet he did not recognize its champion. After the party broke up, he went to his fellow passenger and introduced himself, apologizing for not knowing an employee of his own company. "Oh," said the man, "I have no connection with the power company. I am a clergyman. But I have been greatly impressed by the constructive work which the office of your utility in our community has carried on."

His "we" had been a community "we," spoken out of pride of ownership. Here is a real tribute to the policy of taking the public into partnership. It is the true solution to the unending problem of how to combat the propaganda of public ownership.

Price-Competition as a Stimulus to Sales Campaigns

THAT high-grade electrical merchandise, properly advertised and properly installed, can be sold in the face of price-competition is the experience of the British Columbia Electric Railway Company, Ltd. On another page of this issue is a description of a kitchen lighting campaign staged by that utility. During the course of the special sale, a non-electrical merchandiser in the city brought out a competing

kitchen unit at a much lower price. Advertising and sales arguments of the British Columbia company were changed to meet this competition. Not only did its salesmen sell just as many units per day as they had previously, but the volume actually increased until the closing week they were selling 400 units per day. The natural tendency would have been to cut prices to meet the competition. However, competition merely served to increase the efforts of the salesmen and to make the campaign even more successful than had been anticipated. The experience of this utility should serve as an example to other public service companies or to electrical dealers faced with a similar situation.

The Debasement of the Title "Engineer"

"ENGINEER:—I. vt. To execute or manage by contrivance; to plan and superintend the construction of. II. n. One versed in or practicing any branch of engineering; one who manages an engine; an engine-driver; a manager; an inventor; a plotter,"—states a standard dictionary.

Even if we consider only the second half of the definition, that dealing with the word as a noun, it is evident that confusion as to actual meaning is admitted by the accepted authority of the English language. Until recently the term "engineer" really meant something, because it referred to a person who possessed specialized technical training. Such a title could not be assumed except on the basis of from four to six years of specialized training at a recognized institution of learning or, perhaps, through several times that length of time spent in practical field work. The latter would apply, for instance, to the locomotive engineer, the stationary engineer, the marine engineer, and such persons as had gained a creditable amount of technical knowledge through practical experience and hard knocks.

Times have changed, however, and not particularly for the better. We see mingled with the professional application of the word such incongruities as "service engineer," "cleaning engineer," "binding engineer," and from the trend of things we may next expect to find the term applied to the municipal dog-catcher and the village constable. A certain New York daily mentions in all seriousness a "social engineer." The result is a term that means less than the average cross-word puzzle or double-ciphered infinitesimal which our professors so fondly dwelt upon.

Another serious aspect of the situation is the so-called school of engineering that advertises its ability to transform any student into a civil, electrical, mechanical, or what-not "engineer" in one or two or, at the most, three years and without previous technical training of any sort whatsoever. These institutions bleed alike the true engineering profession and the uninformed prospective student who is attracted by glowing promises of "big pay."

It would seem that both evils could be curbed quite effectively through legislation licensing the use of the word "engineer," and providing suitable safeguards and standards which would elevate the profession in the public mind and faith to a plane equal to that occupied by the other recognized professions. "Diploma mills" are quite as dangerous to the fundamental structure of things when regarded from an engineering standpoint as they are when viewed from a medical angle. Recognized institutions of higher learning realize the dangers of the present trend, but the first move toward correction must come from the engineering field itself.

As a possible solution to the difficulty, the suggestion has been made that the term "engineer" as now applied to this technical profession be abandoned in favor of a new one of more exclusive meaning. "Technologist" is suggested and is perhaps the most descriptive yet offered. For instance, the person fulfilling the necessary requirements in electrical theory and practice would be permitted to use the title "electrical technologist." It would appear, however, that something more than a new word is necessary if the desired end is to be accomplished.

Success of N.E.L.A. Convention Depends Upon United Western Effort

ANNOUNCEMENT on another page of this issue marks the first step in organizing for the convention of the National Electric Light Association to be held June 15-19 next. An inspection of the committee personnel and particularly the number of committees required gives some idea of the magnitude of the task assumed by the industry on the Pacific Coast.

It is expected that the registration will exceed 3,000, of which not less than one-third will come from states other than California. The San Francisco auditorium, with its main assembly hall seating more than 10,000 and the many smaller halls for the section meetings, assures ample accommodations for the business sessions, while San Francisco hotels will be able to furnish a type and variety of entertainment to suit all tastes without the least overcrowding.

Even so, requests are already coming in for hotel accommodations. These will increase in number as the time grows nearer. In the meantime committee chairmen are busy casting about to fill up the ranks of the workers for their respective tasks. It is believed that the entertainment committee will have everything but sleep during the eventful week. With San Francisco's attractions so numerous and varied, visitors from the Middle West and East have a real treat in store for them, and, in truth, the best we have will be none too good.

In order that the convention may be an unqualified success, all branches of the industry in the West must cooperate in a wholehearted manner. Gatherings like conventions do not run themselves. That they may function smoothly, that confusion and loss of time may be avoided, many men must give of their time and energy, numerous tasks must be done, countless details must be given attention. Members of the committees will be busy men.

Those who are not yet members of the Pacific Coast Electrical Association should hasten to send in their applications. Truly, the forthcoming convention is an obligation not only of the committeemen but of every individual within the industry. It will be a great thing for the West, this convention, and the entire industry must unite in showing our guests that Western hospitality is something more than a mere figure of speech.

Another Triumph for the West

THE winners in the National Home Lighting Contest have been announced. The first prize goes to Miss Julia Groo of Portland, Ore. This Western girl will build her $15,000 electric home in that city. The second national prize, a $1,200 scholarship in any college or university, goes to Guadencia Pinaroc, a Filipino high school boy of Oakland, Calif.

The electrical industry of the West has cause to rejoice. The work of conducting the Better Home Lighting Contest called forth the united efforts of all elements of the industry, and the million or more entries in over 5,000 communities in the United States and Canada indicate how well this work was done. Certain benefits, many of which are already apparent, are bound to accrue to the various branches of the industry. Besides this, on account of the recent announcement of the prize award commanding front-page space throughout the entire country, all eyes have been focused for a brief time on the National Electric Light Association, placing that organization and all connected with it in a most favorable light.

Of course most of the direct benefits of this publicity will go to Portland. The model home will be a show place in that city for some time, and the electrical men of Portland will have a rare opportunity to point to it as an example of what electricity can do for the comfort and happiness of all who are wise enough to make use of its many services. True, it is Portland's triumph—but the entire West will bask in the reflected glow of that triumph.

Work of the California Electrical Cooperative Campaign

CALIFORNIA is credited with many accomplishments in behalf of the electrical industry; in fact, our Eastern brothers are inclined to criticize us for boosting indiscriminately. Nevertheless, the fact remains that they look to us for leadership in many important particulars.

This is the season of the year when the affairs of the California Cooperative Campaign come up for consideration—financial consideration, that is—and a word or two on the subject of the campaign is appropriate at this time. To give anything like a story of the work of the campaign would involve writing a history of the commercial phases of the industry itself, for the campaign has been the focal point about which the best minds of the industry gathered and worked out its problems.

The convenience outlet is a term that has made history, and will maintain that place in spite of some ill-advised attempts to change it. The electrical home, a distinctly California product, had its inception in the Cooperative Campaign. Then the countless other applications of the "Do it electrically" idea, cooking, heating and refrigeration, are ripe for further development.

In California there will be added to the installed capacity of central stations more than 250,000 hp. in hydroelectric energy in 1925, to say nothing of the existing field that has been scarcely scratched. Never has there been a greater need for the kind of service to the industry that the campaign can render than now. And the industry will profit many times over for the relatively small support that it is called upon to render.

There is not a cloud on the 1925 electrical horizon, so let us make hay while the sun shines.

DISCUSSION

Calls Attention to Misquotation of Cost of Pit No. 3 Tunnel

To the Editor:

Sir: Several days ago I called your attention to an error in a news item which appeared in the Dec. 15, 1924, issue of the Journal on page 455, entitled "Pit No. 3 Bore Holed Through and Ready for Lining." The last paragraph of this article reads as follows: "The time and cost of the job to date is running well under estimates prepared before the work was started. The cost of the work up to Sept. 25 was $1,038,000, while the estimated total cost of the completed tunnel is $3,500,000."

The figure of $1,038,000 covers only labor cost for work done by this company up to Sept. 25 and does not include such items as powder, timbers, power, etc., nor does it include the indirect cost such as camps, equipment, housing, roads, trails, interest during construction, etc. Again, too, something over 2,000 ft. of this tunnel was done by contract, the cost of which is not included in the figure $1,038,000.

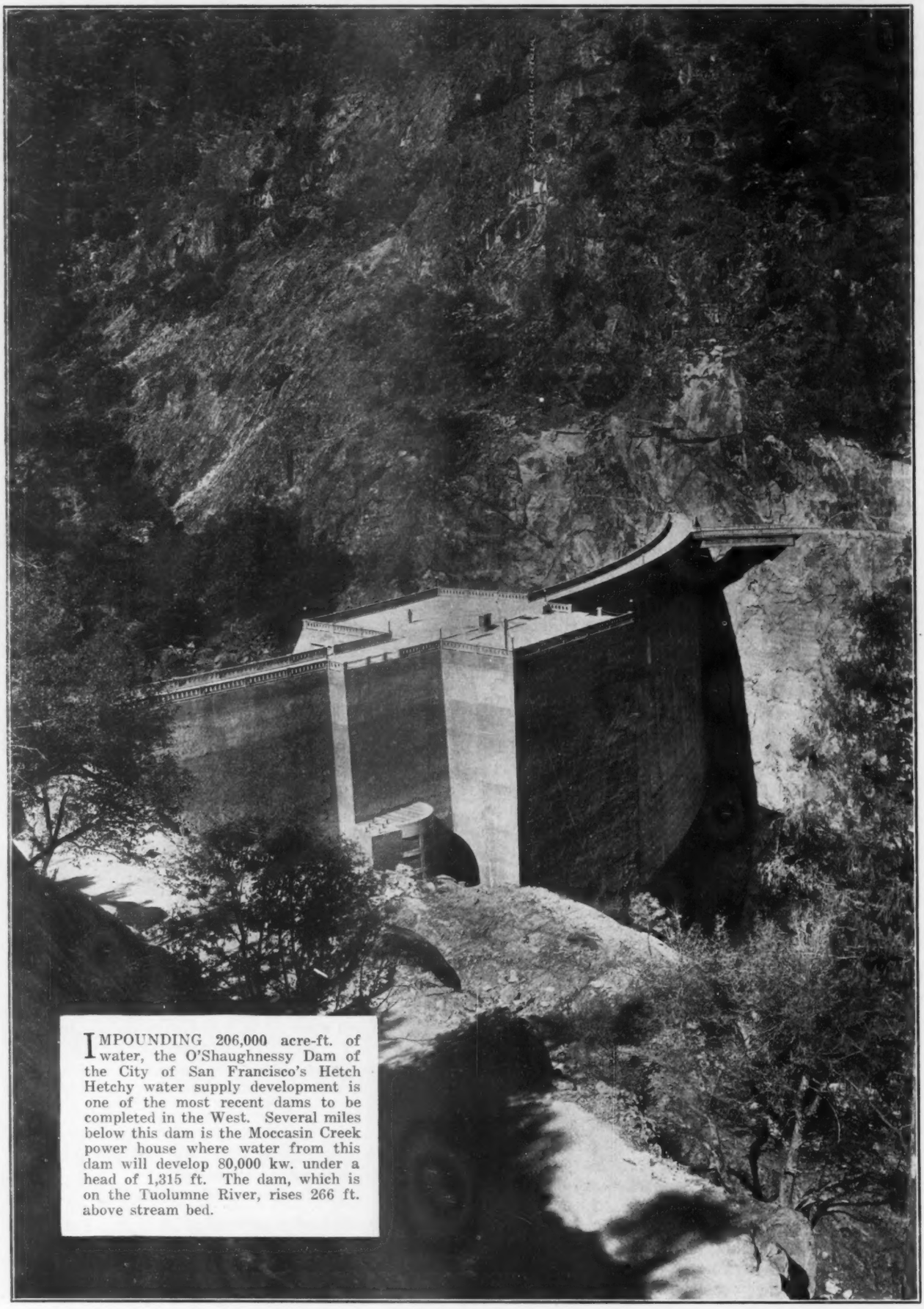
You will readily understand that the indirect costs of a job such as this are substantial items of cost and will materially increase the figure given. The final figures showing the completed cost are not yet available and I am therefore not in a position to say what this cost should be.

It is to be regretted that you were furnished with the wrong figures but unfortunately mistakes of this kind will occur occasionally.

P. M. DOWNING,

Vice-president in charge of Electrical Construction and Operation, Pacific Gas and Electric Company.

San Francisco, Jan. 7, 1925.



IMPOUNDING 206,000 acre-ft. of water, the O'Shaughnessy Dam of the City of San Francisco's Hetch Hetchy water supply development is one of the most recent dams to be completed in the West. Several miles below this dam is the Moccasin Creek power house where water from this dam will develop 80,000 kw. under a head of 1,315 ft. The dam, which is on the Tuolumne River, rises 266 ft. above stream bed.

Customer-Ownership From the Standpoint of the Utility Customer

By E. J. Beckett
Assistant Treasurer, Pacific Gas and Electric Company, San Francisco, Calif.

IN this article Mr. Beckett departs from the practice of considering customer-ownership from the utility's point of view and deals with the benefits that accrue to the public. His analysis of the ownership of a representative company shows the growing tendency on the part of the public to purchase small blocks of utility stock.

THE "customer-ownership" plan of stock selling by public utilities has become so well known that it needs no introduction. Although originated only ten and one-half years ago, the movement to promote home ownership of public utilities has reached such proportions that in the past decade over seven million shares of stock of the electric light and power companies of this country have been sold direct by these companies to approximately one million investors, $200,000,000 worth of stock having been so disposed of in 1924. These figures, covering merely a single branch of industry, afford some conception of the magnitude of the movement, which has been embraced also by gas, telephone and telegraph, street railway and other public service corporations throughout the United States and has been responsible for the dissemination of securities among the general public to an extent which would have been practically impossible under the old methods of underwriting security issues.

A recent authority* estimates that the number of stockholders in the United States increased from 7,400,000 in 1910 to 8,600,000 in 1917 and to 14,400,000 at the close of 1923. While this vast increase in the number of investors in recent years cannot fairly be ascribed entirely to the efforts made by the utilities to popularize their securities among the local public, there can be no question but that it is attributable in large measure to the appreciation by corporation managers everywhere of the soundness of the principles underlying the customer-ownership movement. Of particular interest is also the statement made by this writer that whereas in 1917 individuals with incomes of less than $5,000 per annum received but 9.5 per cent of all dividends paid by corporations throughout the country, in 1922 they received 18.4 per cent, thus doubling their proportionate share of the profits of industry in five years. Literally millions of wage earners, who but a few short years ago would have associated stock certificates with affluence and regarded all bondholders as belonging to the gilded rich, now cash their quarterly dividend checks or clip their coupons as a matter of course.

*H. T. Warshon in Quarterly Journal of Economics, November, 1924.

It is appropriate enough that in California, where the customer-ownership movement had its inception, there should be a larger proportion of the population participating in the proprietorship of the public utilities than is probably the case in any other state in the Union. A recent survey shows that there are at the present time approximately 125,000 owners of the preferred and common stocks of the twelve largest gas and electric companies operating in this state, of whom 112,000 actually reside within its boundaries. Assuming each stockholder to represent a family of five persons, these numerous partners of gas and electric companies in California would populate a town almost as large as San Francisco. As previously indicated, however, it is only within the last few years that this widespread distribution of ownership to the public has been accomplished. The initial step was taken by the Pacific Gas and Electric Company in June, 1914, and some of the results of that company's campaign are noted later in this paper.

Much has been said and written about the advantages to the public utilities of this general distribution of their securities among their customers. It is fairly obvious that a plan of this kind, which enables a public service corporation to finance a considerable portion of its construction program through the sale of stock, and at the same time to secure the favorable interest of a large and representative class of people, naturally commends itself to the utility companies. It is not proposed to discuss this phase of the subject here. The advantages accruing to the general public from such a scheme, however, while none the less real, have probably not been so widely discussed or so generally appreciated. As a matter of fact, in the final analysis the general public is the real and ultimate beneficiary under this plan.

Stimulus to General Industry

The dependence of industry and agriculture in California upon an ample supply of electric energy is now fairly well understood. The extent to which the vast strides made in the electrical industry in that state within the last few years have been made possible by the customer-ownership plan is not so generally realized. Largely by this means the power

companies have been enabled to carry forward a tremendous program of extension and development involving the expenditure of hundreds of millions of dollars for wages and material, at the same time furnishing a strong and enduring stimulus to industry of every character through the additional amount of electric energy thus made available. Under this stimulus, aided by natural advantages of climate and unsurpassed facilities for rail and water transportation, California is developing rapidly as a

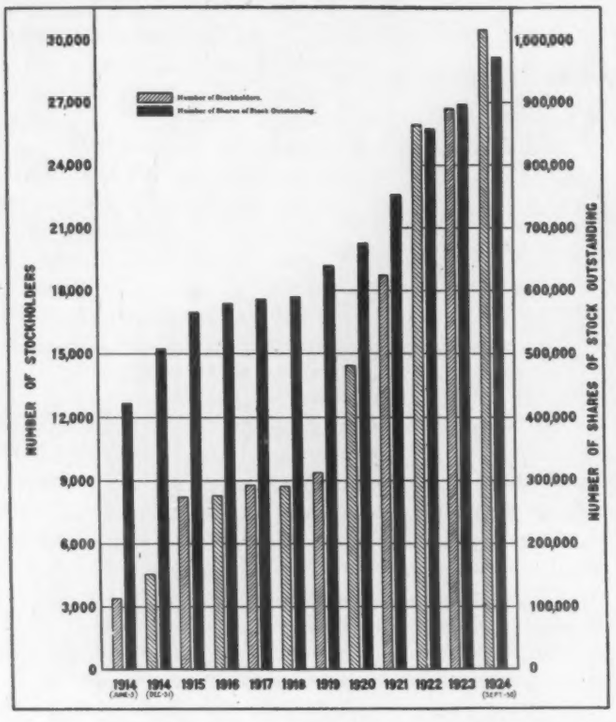


Chart comparing increase in Pacific Gas and Electric Company stockholders with increase in outstanding stock since initiation of customer-ownership plan.

manufacturing as well as an agricultural state. The benefit, direct and indirect, to every resident of that section of the Pacific Coast is at once apparent.

Benefit of Lower Cost of Capital

Customer-ownership, however, has not only been instrumental in furnishing the direct means of raising a large amount of the necessary capital through the sale of stock to a multitude of local investors, but through the increased equity secured by this junior financing it has very materially facilitated the sale of bonds. A better market for new securities means a lower price paid for capital. Since the cost of securing funds for necessary extensions and facilities is a highly important factor in rate-making proceedings, it follows that the consumer taking service under rate schedules based on a lower cost of capital receives the direct advantage of the improved credit position of the utility.

Another factor which tends to lower the cost of capital is the relatively slight expense incurred in the direct sale of securities, which is in the great majority of cases lower than the underwriting fees customarily charged by investment houses. In this connection, the following statement of costs incurred by the Pacific Gas and Electric Company in selling $38,500,000 par value of its first preferred stock indicates that this large volume of financing was accomplished at an average expense of only 88.5 cents per share.

Selling Costs of First Preferred Stock June 3, 1914, to Dec. 31, 1923.

	Total Cost	Cost per Share
Commissions (in recent years paid only to employees)	$126,886.86	$.329
Advertising	124,092.79	.322
Printing, paper and postage	43,811.54	.115
Salaries and expenses of stock sales department	45,903.62	.119
Total cost	$340,694.81	$.885

Better Service

Relations between the general public and those companies supplying it with everyday services which have become so integral a part of daily life have immeasurably improved during recent years, largely because of the new source of personal contact between the company and the public afforded by a large body of customer-stockholders. The public has been and will continue to be the gainer from the better mutual understanding thus established, receiving improved service as a result of greater solicitude on the part of the utility to merit popular favor, coupled with its better financial ability to meet the demands of a growing territory.

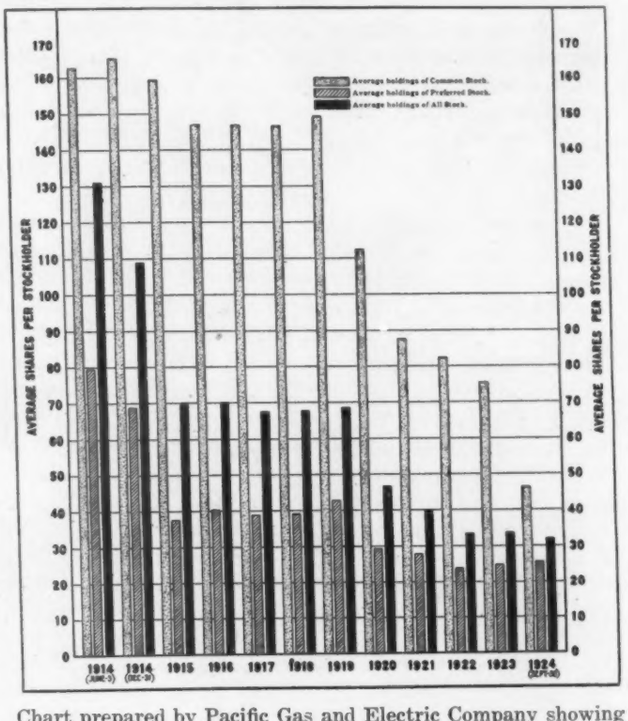


Chart prepared by Pacific Gas and Electric Company showing decreasing average holdings of stock since initiation of customer-ownership plan.

Encouragement of Thrift

Not the least among the advantages which accrue to the public may be cited the stimulus given to the cultivation of thrift. Thrift is a character-

builder, individual and national. All educational work to be successful must be done with the individual, and the public utilities are performing a real public service by fostering the habit of thrift among wage earners. Thrift in the abstract is an excellent thing, but for most people some definite tangible plan of continuous saving is necessary. The utilities, by permitting of the purchase of stock on the installment plan, have probably done as much to stimulate thrift as any other single agency within recent years. They have not only shown how small amounts of money set aside periodically soon accumulate into sizable sums, but they have also shown how the savings of even the most inexperienced investor can safely be made to earn a much larger average return than that paid by the savings banks. They have made direct investment, rather than investment by proxy through the medium of savings banks, easy of accomplishment.

One need only to glance at the following classification of the Pacific Gas and Electric Company's stockholders with respect to the size of their holdings to realize the appeal which a local utility security of the right kind makes to the very large class of individuals whose buying power is somewhat limited. Of the 30,270 individuals who owned stock in this company at the close of October, 1924, more than one-half—16,255 to be exact—owned ten shares or less. Of these 1,971 owned one share only, 1,791 owned two shares each, 1,048 three shares, 797 four shares, and 3,599 lots of five shares each. It is entirely safe to say that literally thousands of these small stockholders are making their very first investment, and through this means are at least making a start on the road to financial independence.

Classification of Stockholders of Pacific Gas and Electric Company, Oct. 31, 1924.

	Total Stockholders	Per cent of total	Accumulative totals No. of Holders	Per cent
1 share each	1,971	6.5	1,971	6.5
2 shares each	1,791	5.9	3,762	12.4
3 shares each	1,048	3.5	4,810	15.9
4 shares each	797	2.6	5,607	18.5
5 shares each	3,599	11.9	9,206	30.4
6 to 10 shares each	7,049	23.3	16,255	53.7
11 to 25 shares each	7,022	23.2	23,277	76.9
26 to 50 shares each	3,687	12.2	26,964	89.1
51 to 100 shares each	2,001	6.6	28,965	95.7
101 to 200 shares each	821	2.7	29,786	98.4
201 to 500 shares each	349	1.2	30,135	99.6
501 to 1,000 shares each	69	0.2	30,204	99.8
Over 1,000 shares each	66	0.2	30,270	100.0
Total	30,270	100.0		

The extent to which people of all classes purchase the stocks of local utilities is also well exemplified by the great diversity in the size of holdings indicated by the foregoing tabulation, ranging from 1,971 holders of one share each to 66 holding blocks of over one thousand shares.

The attractiveness of issues of this character lies largely in the stability peculiar to this class of industry. Census figures show that 58.67 per cent of the population of the United States is dependent on the electric utilities alone for the necessities of domestic and commercial use, as well as for large power service for manufacturing and agricultural purposes. The use of gas for cooking and heating purposes is also an indispensable feature of modern domestic life, sales of manufactured gas in this country having increased at the average rate of over 10 per cent per annum for the past fifteen years. There is little prospect of overdevelopment in either the electric or gas industry, and the supervisory action of regulatory commissions, which precludes the issuance and sale to the public of worthless securities, furnishes an added assurance of safety.

The public utilities themselves naturally spare no effort to see that the securities which are sold to their patrons are made as safe as is humanly possible, since it would be courting disaster for a public service corporation, after broadcasting its securities among the local public, to have anything go wrong with the investment. Among the hundreds of millions of dollars' worth of securities which have been sold under the customer-ownership plan in the last ten years, the writer has yet to learn of a single company which has failed to continue its interest and dividend payments upon the issues disposed of in this manner. In this connection, the following excerpt from a review of "The Public Utility Field" by John Moody, New York analyst, who enjoys a national reputation as an impartial authority on investment matters, voices an opinion which is now quite widely held among people who are qualified to form an accurate opinion on the subject:

"The existing situation and future outlook confirm our endorsement of a year ago, expressed as follows: 'We have come to regard public utility securities taken as a whole as the most desirable and attractive class in the investment market today.' At the time that opinion was widely quoted by the press of the country; we reaffirm it today."

Vigilance Committee Urges Uniformity in Stating Mark-up.—In the interest of clarity and to protect some retailers from possible loss on merchandise through misconception of the margin available, the National Vigilance Committee of the Associated Advertising Clubs has issued a bulletin suggesting that all firms, in stating the mark-up available to the retailer, either figure the mark-up on the basis of the selling price of the merchandise, or clearly state that the mark-up advertised is figured upon the price paid by the retailer. The committee, with forty-two Better Business Bureaus in as many important cities and vigilance committees in many of the 320 local advertising clubs, is working for the elimination of deception from advertising. The bulletin of the committee states that, "In the interest of the merchant who endeavors to determine what his costs of doing business are, to promote clarity and to avoid provoking even the semblance of criticism, it is recommended that all advertisers, in making statements as to the margin or mark-up on an article of merchandise, either base percentage figures on the selling price, or state that the percentage is based upon cost, when that is the case; and it is further and especially recommended that traveling salesmen be instructed in this respect."

Records Show 1924 Was Year of Lowest Stream Flow in California

By H. D. McGlashan, M. Am. Soc. C. E.
District Engineer, Water Resources Branch, U. S. Geological Survey, San Francisco, Calif.

RECORDS collected by the Water Resources Branch of the Geological Survey in cooperation with the state and other agencies in California show that the water year ended Sept. 30, 1924, is the lowest on record for most streams in that state. Many of the smaller streams were dry, and on most large streams both the minimum and seasonal discharge were lower than that shown by any previous record, and had it not been for good administration of the available water supply and rigid conservation by users, serious economic conditions would have resulted.

The situation in the mountain areas was very serious. As a result of the deficient precipitation during the winter months and the long period during the spring and summer without rain, the fire hazard was greater than in many years. In California, during the first ten months of 1924, there were 1,920 fires, and 352,000 acres were burned over in the National Forests, and on state and private lands 590 fires burned over a total of 479,000 acres.

For the period 1911-1924 inclusive, the average number of fires per year in the National Forests of California was 1,083 and the average area burned over annually was 109,380 acres, or about one-half of one per cent of the total area. At this rate of burning it would take 186 years to burn over all National Forest lands in the state—about two generations of tree growth.

Because of this great fire hazard in the California National Forests, approximately eleven million acres were closed to all public use except under permit from the Forest Service; three million acres were restricted as to camping and smoking; while on five million acres there were no restrictions.

The precipitation records collected by the United States Weather Bureau show that the seasonal rainfall for the year ended June 30, 1924, averaged less than one-half normal. As a result, both ground storage and accumulated snow in the mountains, which are the two principal sources feeding the streams in California during the summer season, were at a minimum. Practically no rain fell during the summer months. Table I shows the precipitation at representative stations throughout California for the year ended June 30, 1924.

The extent of low water conditions as compared with previous years for various streams in the state is given in Table II. This shows that the annual run-off for 1923-24 varied from 1 to 66 per cent of the mean for all the years of record on each stream and averaged 25 per cent for the 20 streams covering three major drainage basins of the state. The run-off for 1923-24 was much lower than ever before recorded, except in the South Pacific drainage. A few of the stream-flow records in Table II are affected by some regulation for power purposes or by diversions for irrigation, but generally the comparison with other years on the same stream is good.

Information in regard to conditions early in the year indicated that the season would be a very critical one, and as a result there was a concerted effort on the part of all water users to conserve the supply and make the best possible use of the limited water available.

The Permanent Committee of the Sacramento and San Joaquin River Problems Conference, composed of thirteen officials representing navigation, railroads, irrigation districts, power companies and ranchers throughout the Sacramento and San Joaquin Valleys, took charge of the situation in the two valleys.

"In order to avoid litigation, strife and expense, to bring about the greatest possible conservation of water and to lay the foundation for the future settlement of difficulties arising from the use of water," this committee perfected an organization and appointed as water supervisor H. M. Stafford of the Division of Water Rights. He was instructed to measure the diversions and waste of water by all users and determine the amount of water flowing in the rivers at important points. In addition, he was charged with the duty of closely watching wasteful users of water and taking appropriate steps for the prevention of waste.

Station	July 1, 1923, to June 30, 1924	Normal July 1 to June 30	Per cent 1923-4 was of normal
	In.	In.	
Eureka	20.72	46.05	45
Red Bluff	12.02	25.03	48
Sacramento	7.99	20.09	40
San Francisco	11.62	22.27	52
San Jose	6.55	16.79	39
Fresno	5.24	9 68	54
San Luis Obispo	8.19	20.51	40
Los Angeles	6.67	15.64	43
San Diego	5.66	10.01	57

Table I—Precipitation in California for the year ended June 30, 1924, compared with the normal.

In San Diego County, the water supply was adequate on account of holdover storage in reservoirs and availability of ground water. San Bernardino, Riverside, Orange and Los Angeles Counties depend mainly upon ground water except in the area served by the Los Angeles aqueduct. The shortage of

River measurement station	Drainage area	Length of record	Mean discharge for 1923-24	Average annual discharge for entire record	Per cent 1923-24 was of average	Minimum previously recorded		Per cent 1923-24 was of previous minimum
						Discharge	Year	
	Sq. mi.	Years	Sec.-ft.	Sec.-ft.		Sec.-ft.		
Sacramento River Drainage Basin—								
Sacramento River—Red Bluff	9,300	29	4.100	12.500	33	5,380	1919-20	76
Pit River—Big Bend		13	2,100	3,160	66	2,390	1922-23	88
McCloud River—Baird	665	13	888	1,850	48	1,100	1919-20	81
Feather River—Oroville	3,640	22	1,640	6,870	24	2,830	1919-20	58
Yuba River—Smartville	1,220	21	610	3,380	18	1,490	1919-20	41
Bear River—Van Trent	263	19	31.9	493	6	121	1911-12	26
American River—Fairoaks	1,910	19	731	4,120	18	1,740	1911-12	42
Cache Creek—Yolo	1,230	21	8.22	629	1	3.94	1919-20	209
Putah Creek—Winters	654	17	53.2	556	10	58.7	1919-20	91
San Joaquin River Drainage Basin—								
Tule River—Porterville	266	23	25.5	157	16	40.4	1912-13	63
Kaweah River—Three Rivers	520	21	140	598	23	285	1911-12	49
Kings River—Sanger	1,740	29	539	2,510	21	1,220	1897-98	44
San Joaquin River—Friant	1,640	16	698	2,600	27	1,200	1912-13	58
Merced River—Exchequer	1,020	20	348	1,450	24	608	1912-13	57
Tuolumne River—La Grange	1,500	29	1,030	2,740	38	1,330	1897-98	78
Stanislaus River—Knights Ferry		26	344	1,720	20	512	1897-98	67
Mokelumne River—Clements	631	19	251	1,160	22	541	1911-12	46
Cosumnes River—Michigan Bar	525	16	55.6	532	10	176	1912-13	32
South Pacific Drainage Basin—								
Sweetwater River—Descanso	43.7	18	2.44	16.7	15	1.75	1920-21	139
Santa Ana River—Mentone	189	24	70.2	115	61	42.2	1903-04	166
San Gabriel River—Azusa	222	29	38.5	173	22	13.5	1898-99	285
Arroyo Seco—Soledad	215	23	22.8	192	12	19.7	1912-13	116

Table II—Stream flow in California for the year ending Sept. 30, 1924, compared with the average of all records and with previous minimum year.

water in these counties was due more to lack of power for pumping than to a decrease in the available supply.

The supply from Kern River was very short, and the water was prorated among the various users. Kings River run-off was so deficient that 40,000 acres normally irrigated from the stream received no water during 1924.

The Sutter Butte Canal Company receives its supply from the Feather River below the Western Canal Company's diversion. Its normal irrigated area of about 18,000 acres was reduced by 4,000 acres at the beginning of the season, on account of water shortage. At a large expense, temporary pumping plants were installed to recapture waste water from their drainage ditches. The Yolo Water & Power Company obtains its supply from the Clear Lake, Cache Creek drainage basin. This season they had practically no water for irrigation.

In other areas in northern California, where some storage has been developed, the situation was more satisfactory, and fair crops were reported. The most serious shortage in the San Joaquin and Sacramento Valleys occurred in parts of the San Joaquin drainage where no storage was available. The marked reduction in the area planted to rice in the Sacramento Valley helped somewhat to relieve the situation and, although the yield of most crops, including deciduous fruits, almonds, grapes and rice, was not so large as in previous years, the prices were uniformly higher, resulting in a larger net profit to the farmers.

On account of the large amount of hydroelectric power developed in California, the power situation was especially serious, and H. G. Butler, who acted as power supervisor in 1920, was reappointed to this position.

In southern California, a general reduction of 25 per cent, based upon the use during 1923, was ordered. This made it necessary to install many gas and oil engines both for pumping and for industrial uses. The use of electric lighting for advertising and display purposes was banned; street lighting was reduced to the bare requirements for safety, and street car systems in Los Angeles adopted the skip-stop system as a means of economy. Certain users were not allowed power, except during the night when their load could be carried by steam plants without interfering with more important uses of power. Considerable difficulty was experienced in enforcing these restrictions, and the net result was a saving of about 20 per cent.

Late in the season, with the reduction of the pumping load in the San Joaquin Valley, more power was available for southern California, and the restrictions for agricultural and industrial purposes were lowered to 15 per cent and entirely removed for domestic use.

All available steam plants, including many owned by municipalities and private parties which had not been in use for several years, were operated at full capacity 24 hours each day. The hydroelectric plants, except where the water was required for irrigation or would otherwise be wasted, were operated only during the peak loads.

The seasonal rainfall in northern California on Dec. 16, 1924, was slightly in excess of the normal and nearly double the precipitation on the same date in 1923. Conditions in this area are now much improved, as they affect agriculture and power development. In the remainder of the state the fall rains have been too light to afford much immediate relief.

The World's Largest Electric Chick Hatchery

By M. J. Brooks
Consulting Electrical Engineer.

SHORTLY after its old hatchery had been destroyed by fire, the Must Hatch Incubator Company of Petaluma, Calif., erected a new chick hatchery which is completely electrified. This hatchery is the largest electrified plant of its character in the world and has a capacity of 560,000 eggs at one setting. The accuracy of the temperature control in the electrified incubators has been a great factor in assuring the success of this hatchery, and the operators are of the opinion that electricity furnishes the most satisfactory heat for this purpose.

The plant of the Must Hatch Incubator Company during the busy season ships 25,000 baby chicks daily, and the normal production for the season is 3,000,000 chicks. These chicks are packed in cardboard cartons that hold 100 newly hatched chickens and are shipped by parcel post or express, without food or water, to Arizona, Oregon, Washington or Idaho, as well as California points, as the demand occurs.

The eggs are supplied locally from approved stock, and with a stream of chicks leaving the plant and a stream of eggs going in at the same time, the effect is that produced by a factory working at top speed. While some chicks are produced throughout the year, the heavy hatching season begins about the first of February and ends during June.

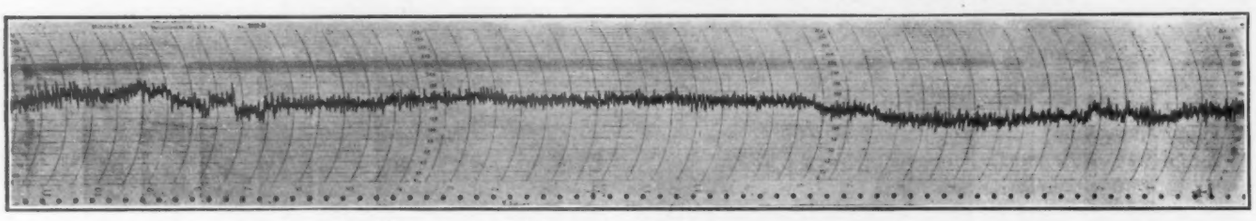
The plant consists of a hatchery, packing and shipping rooms, and offices in one building, which is of brick and hollow tile construction with asbestos composition roof, making it practically fireproof. It covers 26,784 sq.ft. of ground floor space, with provisions for expansion. The plant is completely electrified, and all wiring conforms to Underwriters' and California Safety Commission requirements. Water for all purposes is supplied by means of a motor-driven pump, automatically controlled.

Power is supplied by the Pacific Gas and Electric Company at 110 volts three-phase, through three 150-kw. transformers installed in a substation adjoining the incubator room. The substation is of hollow-tile construction, and also contains the main 110-volt switchboard, from which are run 20 three-phase circuits to care for the incubator load, and other circuits to care for the general lighting and small power load. The incubator load is divided into units of seven incubators which are handled by individual three-pole safety switches, while each incubator is controlled by its own thermostat which maintains a constant temperature of 103 deg. by cutting the power off and on as required. The load is so balanced that it is hardly possible to throw on any machines which will create an unbalanced condition. The 1,260 incubators are arranged in double-decked rows with working aisles between rows. Lighting is supplied from circuits over each aisle, controlled from either end of the aisle so that lights are burned only where and as needed.

The total load of the hatchery, as shown by the accompanying chart, is remarkably uniform throughout the twenty-four hours of the day. The highest peaks occur while the eggs are being aired during the morning hours, and the lowest, as might be expected, occur during the late afternoon when everything is thoroughly warmed up. The incubator room is not heated, but 53 kw. in heater capacity is installed in the offices and shipping room.

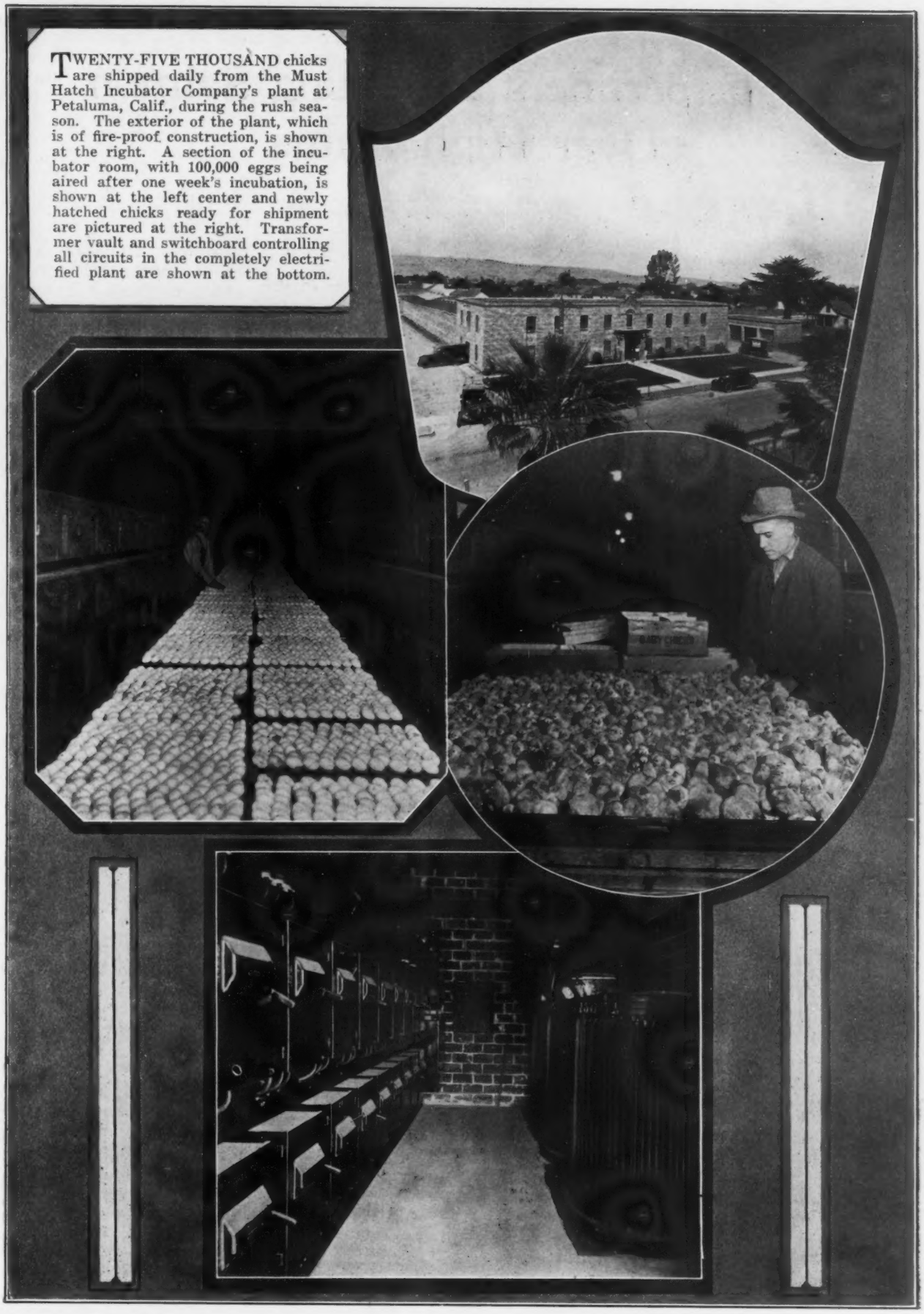
The use of electric power for hatching was not adopted without much careful study and experiment, but now that it has been accepted it has been taken without reservations, and when it is considered what a power failure of even a few hours would mean to this type of industry possessing no other standby source of power, it speaks well for the quality of service now being furnished by the California power companies that hatcheries are not hesitating to adopt the use of electricity for hatching purposes.

Because of the relatively constant demand the load is exceedingly satisfactory to the central station company, and every effort has been made to insure uninterrupted service to the electrified hatcheries. The accuracy of temperature control and the removal of fire hazards that are achieved through the use of electricity in hatcheries are only two of a number of factors that should make for the greater use of electric power in this industry.



Graphic meter record of hatchery load for 24-hour period.

TWENTY-FIVE THOUSAND chicks are shipped daily from the Must Hatch Incubator Company's plant at Petaluma, Calif., during the rush season. The exterior of the plant, which is of fire-proof construction, is shown at the right. A section of the incubator room, with 100,000 eggs being aired after one week's incubation, is shown at the left center and newly hatched chicks ready for shipment are pictured at the right. Transformer vault and switchboard controlling all circuits in the completely electrified plant are shown at the bottom.



An Experiment in Lifting Salmon Over High Dams

By John N. Cobb
Director, College of Fisheries, University of Washington.

MUCH interest has been aroused in the past year by the attempts of the electrical and fishing industries of the Northwest to solve the problem of getting fish over high dams in spawning rivers. Considerable future hydroelectrical development in the West depends on a satisfactory solution of this problem, and the success attained in the initial experiment on the White Salmon River, Washington, augurs well for such solution. In this article Professor Cobb reports on the experiment in full.

EVER since man first began to build dams and other obstructions in rivers, an adverse effect on the animal life of these rivers, notably the fishes, has been noticeable. In the case of the salmons, steelhead trout, sturgeon, shad, alewives, rockfishes, smelt, eulachon and other fishes that enter the rivers for the purpose of spawning and that represent some of the most valuable produce of our fisheries, this was especially noticeable, and it was readily seen that, if the damming of streams was to continue without providing a means of easy ingress and egress for the fishes, an immensely valuable natural resource would be destroyed. It should be noted that the value of the Pacific Coast salmon catch alone in 1923 amounted to some $60,000,000.

Since dams appeared to be inevitable, the thoughts of men naturally turned to the problem of getting fish over them. This problem was very much complicated, especially in the case of the salmons, by the well-known fact that these fish when ready to spawn return to the particular stream in which they spent the early months of their lives before going to the sea, and, if obstructed in their passage up this stream by some insurmountable barrier, beat out their lives against it.

A number of devices, commonly called fishways, have been invented during the past fifty years in the effort to solve this problem. In design these may be divided into four types as follows: (1) the inclined-plane type, in which a series of baffle or deflecting plates is so arranged in an inclined flume as to cause the water to follow in its descent a long, sinuous route; (2) the pool and fall, or step type, in which the water is brought down to a lower level by a series of short falls with intervening pools; (3) the counter-current type, in which the descending volume of water is checked by meeting a current opposing it at certain intervals; (4) the lock-and-gate type, in which a higher or lower level is reached through one or more locks operated by gates.

A few of the devices designed and installed have proved altogether successful; a few have been partially so, while a large majority have been absolutely worthless. In dealing with the Pacific Coast salmons it was early discovered that a fishway in a dam over 30 or 35 ft. in height was of little utility, due apparently to the disinclination of the fish to work their way up it to a height greater than this.

During the last decade the demand for electric power has been increasing at an enormous rate, and the abundance of hydroelectric possibilities on the Pacific Coast made it apparent that there would be considerable development of this power in the coming years. Hydroelectric development means high dams, and so, early in 1924 the writer called the attention of Dr. Henry Suzzallo, president of the University of Washington, to the matter, and recommended that a conference of the leading hydroelectric companies and the fisheries interests of Washington and Oregon, both state and private, be called for the purpose of determining whether there was not some common ground upon which all could get together in the endeavor to solve the problem. The writer's twenty-nine years' experience in the economic fisheries had convinced him that there was a possible solution. Dr. Suzzallo enthusiastically endorsed the suggestion, and the conference was called for the afternoon of May 14, 1924.

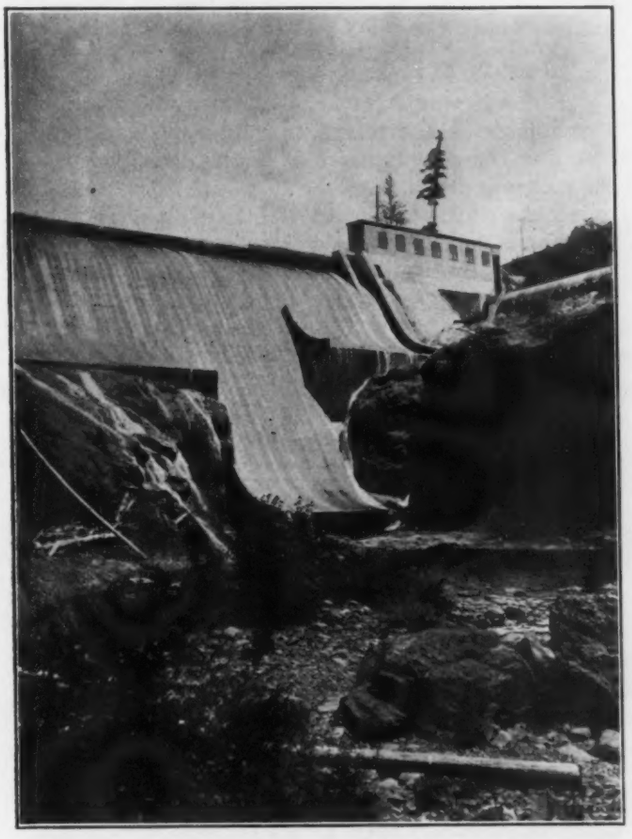
At this conference, which was well attended by representatives of the fishing interests and the power companies, it was determined to undertake some experiments in getting fish up and down over high dams, and a committee was selected to take up the work and endeavor to carry it to a conclusion. At the first meeting of this committee a smaller executive committee was chosen, and direct supervision of the work was entrusted to the writer.

Selection of Site for Experiments

As the first problem was to get the fish over a high dam, and as the conference had decided that the experimental work should be carried on at a dam in operation, the writer visited various dams in California, Oregon and Washington, and finally selected the Condit dam of the Northwestern Electric Company, on the Big White Salmon River, Washington.

This river, a tributary of the Columbia, is located in Skamania and Klickitat Counties and is about thirty miles in length. It is of the usual type of mountain stream, having a steep gradient with the banks occasionally narrowing into canyons.

The Condit dam is about four miles from the mouth of the river, while the power plant is a mile below this point, the impounded water being carried



Condit dam of the Northwestern Electric Company on the White Salmon River, Washington, where the experiments were conducted.

from the dam to the plant through a 13-ft. diameter wood pipe. The dam, which was built in 1911, is about 250 ft. long on the top and 164 ft. at the bottom. The top is about 121 ft. above the ordinary water level. Just below the dam and on the east side of the river is an overhanging rocky ledge, the top of which is 70 ft. above the surface of the pool at the foot of the dam. A line dropped straight down from a break in this ledge touches the upper side of a little bay cutting into the shores of the pool. This bay had been partly excavated during the construction of a fishway installed some time after the dam was built and later removed after the company and the Washington Fish Commission had come to an agreement regarding its removal.

As far as is known, the species of migratory fish frequenting this river are chinook salmon, Oncorhynchus Tschawytacha, and steel-head trout, Salmo Gairdneri. It is said that a very few silverside salmon, O. Kisutch, and dog salmon, O. Keta, also visit the river. The steelhead appears and spawns in the pools just below the dam during the months of April, May and the early part of June. The chinook salmon, and such other salmon as come into the river, run during the months of September and October. In September of each year the U. S. Bureau of Fisheries, which has a salmon hatchery on the Columbia River about a mile below where the White Salmon discharges into the main river, temporarily installs a rack a few hundred yards up from the mouth and holds all the salmon here until they are ripe. The fish are then seined and towed in live boxes to the hatchery, where they are stripped of the eggs, which are fertilized with the melt and put into the hatchery. When the young have been born and have reached the proper age, they are planted either in the Big White Salmon River or in Spring Creek, which furnishes the hatchery's water supply.

The reasons for selecting the Condit dam for the work in question were: the convenient shape of the dam and the banks below it for carrying on the work; the fact that there was available a run of migratory fish in the spring and another in the autumn, the latter of which could be utilized imme-

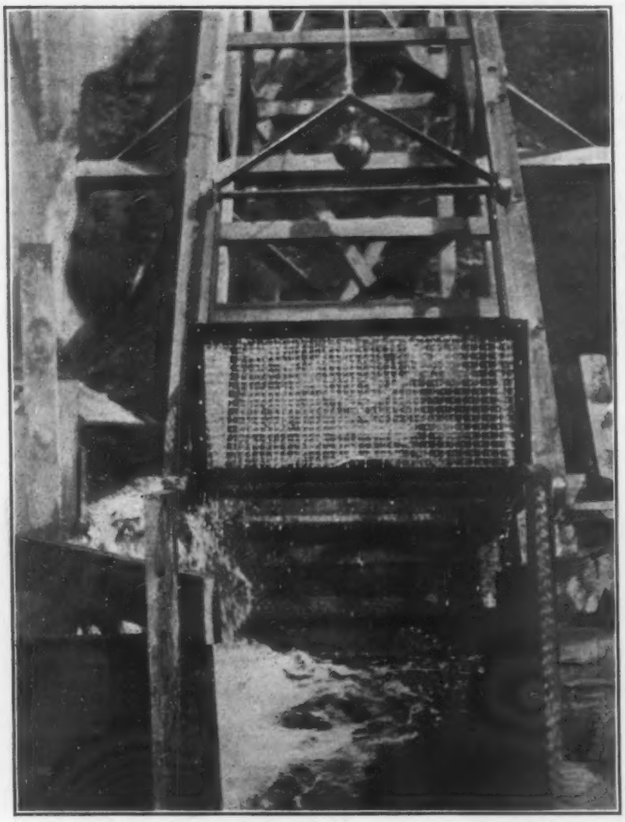
Fish hoist used in the experiments showing the basket about half way up the incline.

diately; and the accessibility of the dam to rail and other transportation facilities.

The Hoisting Device

For a number of years the writer has given much thought to the matter of fishways, and during the last three years has had abundant opportunities

to carry out various ideas in connection with his work for the Washington State Department of Fisheries. In connection with this work experience had taught him that salmon, at least, could not be trusted to work their way unaided through a fishway up over a dam more than 40 ft. high. With this in mind, it was felt that the only hope of finding a solution lay in the building of a mechanical device by means of



A closeup of the wire-mesh basket used in hoisting the fish over the dam.

which the salmon would be lifted artificially. In order to work out the details of this device, the Link-Belt Meese & Gottfried Company, Seattle, was consulted, and its resident engineer, R. S. Drury, was largely responsible for what success was obtained mechanically. The Northwestern Electric Company, through the cooperation of its general manager, L. B. Merwin, its chief engineer, O. L. LeFever, and David Shore, superintendent of the Condit plant, who had charge of the construction of the hoist, did all in its power to facilitate the experiment.

The device used was essentially a skip hoist with a basket or skip, 54 in. long by 60 in. wide, with a minimum depth of 2 ft. 6 in., running on an inclined track of approximately 62 in. gage. As it was to be merely an experimental device and to be removed as soon as the work was completed, but one basket was provided, and this was designed to be raised and lowered by means of a rope from the basket through a cast iron head-sheave to the hoist proper, with a 6-to-1 friction drive. A 5-hp. motor was used to operate the hoist. It should be stated that in building a permanent hoist a somewhat different method would be used.

A wire basket was used because the writer had come to the conclusion that it would be better for many reasons not to lift any water. This was another violent departure from precedent, but the experiment showed that it was a wise move. The basket was made of galvanized iron wire with 1½-in. mesh, this being a width sufficient to permit the basket to empty as fast as it rose from the water and to permit the small fish to escape readily.

Entrance to Fishway and Operation of Hoist

Since it would have been impossible to devise any apparatus competent to gather fish swimming freely in the pool at the foot of the dam, because of the size and depth of this pool, a large box was built to act as the entrance to the fishway. This box, which was made especially strong to withstand the pressure of the water to be enclosed in it, was 10 ft. wide, 12 ft. deep and 12 ft. long at the top and 8¾ ft. at the bottom. It was built on shore and launched into the water of the little square cove that had been the entrance to the old fishway.

As the idea was to induce the fish to jump from the pool into the box where they could be picked up

Closeup of box used as an entrance to the fish hoist showing method of anchoring.

by the basket, it was necessary to have a considerable volume of water flowing out of the spillway of the box. In order to accomplish this a flume was built from the face of the sloping dam to the box, with rude gates at its head so that the amount of

flow into the box could be regulated. Since the experimental device was built only to the top of the bluff, it was necessary to install a large box there into which the fish could be dumped from the basket.

Securing Fish for the Experiments

Due to the fact that at this season of the year the operation of the power plant requires most of the water in the river, there was not enough water flowing in the stream bed between the dam and the power plant to permit salmon to work their way up above the plant. It was necessary, therefore, to arrange otherwise for a supply of fish with which to experiment. This supply was obtained from the U. S. Bureau of Fisheries, which had agreed to furnish some salmon from their rack and corral at the mouth of the river. Accordingly, in order to transport these fish, there was fitted up on Sept. 22, 1924, a 1½-ton automobile truck with a V-shaped metal tank that had previously been used for hauling cement. A large sheet of heavy canvas was put inside the tank and the ends and sides carried to the top of the truck so that the water could not splash out and so that the salmon would be prevented from jumping or being thrown out.

The truck was driven close to the river bank and the tank filled with fresh water while the bureau's crew was hauling the seine inside the corral. When the seine was brought to the bank close to the truck, the medium-sized and smaller chinooks, the greater part of which were males, were picked out of the net and carried to and deposited gently in the tank on the truck. As soon as a sufficient supply had been taken in this manner, the truck was driven as speedily as possible to the nearest point to the dam, where, after being wrapped in a wet sack, each fish was carried down the three stairways, two ladders and a short distance along the pipe line and deposited temporarily in the tank of water at the head of the hoist on the bluff.

Method of Carrying On the Experiments

In all some seventy chinooks were brought up in the truck on Sept. 22 and 23, and a greater part of these were early sent down to the stream, part being placed in the entrance box and part in the corral. A few were held in reserve in the upper box on the bluff. Beginning early in the morning of Sept. 23, the writer kept close watch of the lower box. About the middle of the forenoon one salmon jumped into the box, and this was the only one seen to do this during the duration of the experiment, although possibly some may have done so during the night, which appeared to be the time of the greatest activity among the fish.

About 11 a.m. the basket was first lowered into the box and the real experiment began. It was drawn up five minutes later and one salmon was found in it. Several more lifts were made that morning with the basket submerged only one minute each time but without result. In the afternoon sixteen experimental lifts were made, with the basket submerged from one to thirty minutes, and in eight of these fish were caught. On one lift, when two fish had been caught, the basket was hauled to the top twice and the fish released into the lower box on the second trip down. Despite the fact that the fish had covered some 320 ft. in the journey, they were as lively when finally placed in the water as when they were first lifted out of it. Thus the main point of the experiment was conclusively proved—that if the fish could be brought together and caught they could be lifted almost any height within reason without any water and without any exertion or strain on the part of the fish.

On Sept. 24 the experiments were continued as on Sept. 23, and by varying the flow of water from the flume into the box and varying the speed of the basket, the effect on the fish in the box and in the corral was noted. Other variations in the manner of carrying on the experiments were tried and their effects noted, and all had a bearing on different aspects of the general problem, but the results need not be gone into here. During the experiments eleven fish died. Of these, seven jumped out of the upper box during the night, one was caught in the net over the lower box, two were found dead in this box with every appearance of having been killed by the basket hitting them, while one was found dead in the upper box when the water was drawn off.

Late in the afternoon of Sept. 24, the experiments were discontinued, the device dismantled and stored away pending its use next spring during the run of steelhead trout. At that time the water in the river will be high enough to permit the fish to swim up the river to the foot of the dam. It is also planned at that time to take up the other phases of the problem—the getting down of the young salmon and trout and the old steelheads that have survived the journey, and the devising of means of keeping the fish out of irrigation ditches.

Summary of Experiments

The experiments carried on as noted above developed the following facts:

1. That if the fish can be induced to enter such a fishway, they can be lifted almost any height desired.

2. That they can be lifted without water and that it was a decided advantage not to lift water, since out of water the fish's struggles were extremely limited, while if they had been in water some sort of cover on the basket would have been necessary to keep them from jumping out.

3. That in the majority of cases this method can be employed in getting fish over high dams, provided an experienced biologist, familiar with the habits of the fish to be lifted, is consulted before work on the dam is started. This is absolutely essential because certain precautions must be taken with the bed of the river, before and during the construction period, in order to leave the dam on completion in such condition that the fish will be persuaded to foregather in front of the entrance to the fishway or fish hoist.

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Ground Current Control and Station Grounds

Grounds and Stray Current Control Are Important Points to Be Considered in the Design of a Power Station

By F. H. MAYER,
Electrical Designing Engineer, Southern California Edison Company, Los Angeles, Calif.

The question of the correct design and installation of station grounds is more generally misunderstood than any other electrical term used in connection with station layout. There is a wide difference of opinion in what constitutes a good ground. Most articles written heretofore have dealt principally with the surface area of plates or rods necessary for contact with the earth, and a special effort was usually made to show the best method and material to be used in order to obtain the least possible resistance from conductor to earth.

It is recognized that all these facts are important, but in view of the fact that these points have been thoroughly discussed it was thought not necessary to discuss this phase of the subject any further, but rather to take up the matter of station ground layout as it applies to power houses and substations.

There has been very little published on grounds and control of stray currents in station layout and therefore, as a result of such a condition, many stations are being designed and installed without the consideration that this part of the design should have. Often we read where instruments on the switchboard were burned out or some part of the building or the plumbing was damaged to considerable extent, all as the result of some electrical failure. This can be avoided to a large extent—at least, it can be confined to the area in which the failure occurred—if the correct design is adopted. This naturally suggests the question as to just what constitutes a good ground layout.

The author of this article is of the opinion that there must be five points satisfied, namely:

1. Will it protect human life?
2. Will it protect vital parts of the electrical equipment, such as switchboard apparatus, etc.?
3. Will it permit the equipment installed to function as it is supposed to; for example, lightning arresters and relays?
4. Will it keep the potential of the station down with relation to other stations in case of flashover to ground?
5. Will it protect the steel and concrete in the building where conductors of heavy carrying capacity are supported on the building structure?

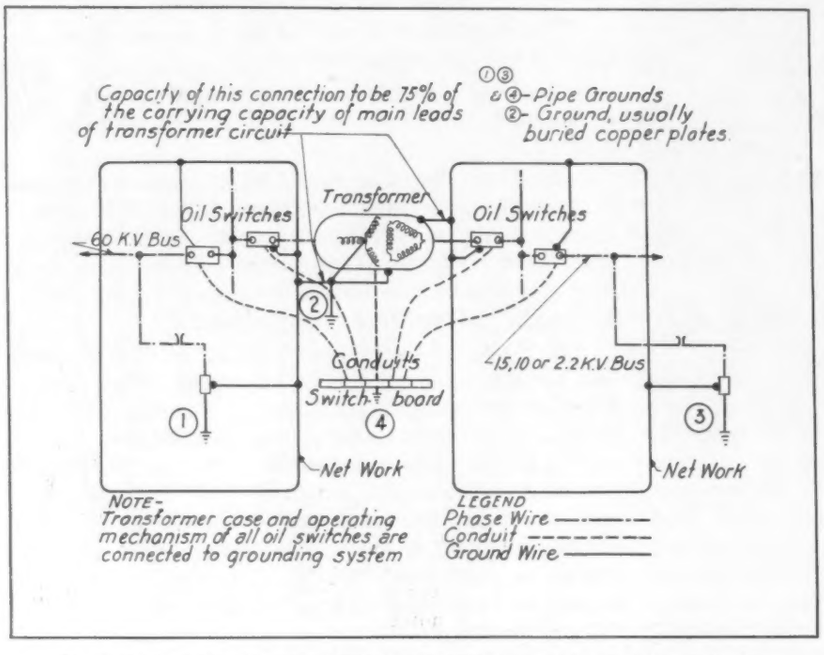


Fig. 1—Diagram showing ground control and grounds for 60/15-10 or 2.2-kv. substation.

In studying the above it is found that there are three fundamental considerations:

1. That the current on the occurrence of an accidental ground always passes, or tends to pass, from the point of failure to the generator, or transformer neutral, or a weaker point of insulation on the other phases.
2. That the potential gradient of an energized conductor when placed in the ground may possibly be quite pronounced.
3. That current will seek the path of least resistance.

In order to satisfy the first consideration, flashover from one phase to ground, foreign to the station, would have its circuit satisfied by tying the power transformer neutral to a so-called ground well. However, for station trouble, due to the difficulty of getting a low resistance ground from rack to earth and from earth to transformer neutral, it was found more advisable to tie all steel to the neutral of the transformers by the use of metallic conductors. These conductors, leading from various parts of the station structure, tend to form a network which incidentally, if properly distributed, cares for the second consideration.

In order to satisfy the second consideration, it is necessary that the conductors be so distributed that a condition will be approached similar to that of a station that is built on a copper plate. Thus, upon the occurrence of a failure from any phase to the plate, the potential of the plate and the entire structure would rise simultaneously. Since the plate idea is not practical from an economic standpoint, it was found to be satisfactory if a network was laid in the soil immediately under the structure that is to close to the earth's surface, or near steel columns, so that the voltage gradient between steel and earth is maintained within safe limits over the area within reach of any part of the electrical equipment or steel structure. Therefore, pursuing this theory further, it naturally follows that all steel columns and apparatus within reach of the earth's surface must be tied to this network. The areas that are out of reach of any steel structure need not be cared for. A design of this sort will permit the grounding of the neutrals of high voltage transformers to their cases with absolute safety to the apparatus and operator.

While the network was designed to bring up the potential of the earth's surface simultaneously with the apparatus at the time of flashover, it is thought that, since there has been no high voltage experienced at Edison stations remote (but connected by telephone) from the station in trouble, the

area between the network and permanent moisture serves as a condenser and has sufficient condenser capacity to enable the entire station to remain very nearly at the same potential as that of the earth. This condenser action also serves as an excellent means of taking care of the high-frequency discharge from lightning arresters, while the low resistance of the network serves very well for carrying the low-frequency power discharge to transformer neutral which usually follows a lightning discharge.

The third and last consideration is very important. Since it is known that current will flow through the path of least resistance, it is evident therefore that, if certain equipment is to be protected, there must be provided a path of lower resistance than that which exists through that particular equipment. So far as the outdoor racks are concerned, this feature is automatically cared for, provided sufficient conductivity is supplied in the network. However, since equipments of different voltages are often remotely controlled by a single control board, as in Fig. 1, the conduit or lead sheaths on the control cables form a low resistance path, usually lower than that which is possible by grounding the equipment with two individual ground wells. So, in order to have the maximum assurance of safety, it is necessary to shunt out the switchboard; that is, connect the two networks with a conductor. This conductor should be made up of at least two cables, each about 75 per cent of the capacity of the transformer circuit, connected from one rack to the other. The two paths are desirable to insure at all times ample carrying capacity, should one cable for some reason or other become severed.

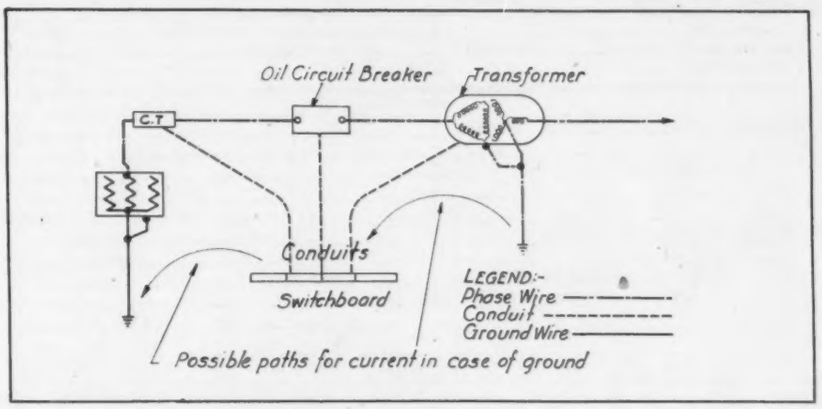


Fig. 2—Diagram of condenser or generator and power transformer with neutral grounded to earth. No metallic control.

It naturally follows, then, that one ground well is usually sufficient. This ground well is placed preferably near the neutral of the power transformers. This is done for the reason that the ground well, as has been said, serves to collect current returning from failures foreign to the station, thus permitting the stray current to return to the transformer neutral without the necessity of passing through much of the network. In a station of large capacity where there are two sets of grounded neutrals, each for different voltage systems, such as in the case of 220 kv. and 60 kv., it is thought advisable to have two ground wells, each located near its respective group of transformers and, in addition to this, to add a connection between their respective networks similar to that mentioned above.

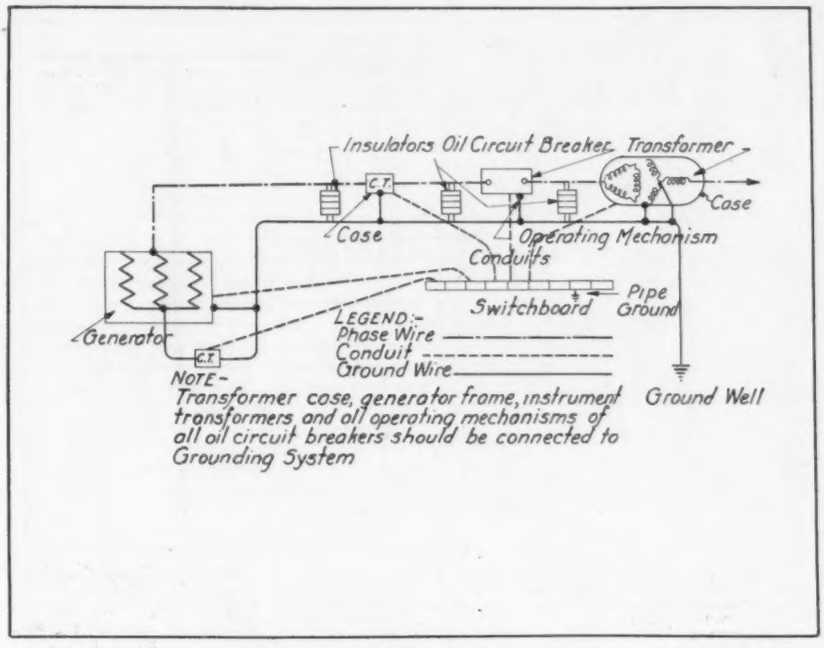


Fig. 3—Diagram of condenser or generator and power transformer with neutral tied to metallic control.

Most of the foregoing discussion on ground current control and station grounds pertains to outdoor installations; however, for indoor installations the same general principles can be applied.

In stations where generators or condensers are installed, the matter of providing control for stray current is of prime importance, both from the standpoint of protecting the building structure and the secondary equipment. The usual practice is to operate generators and condensers of large capacity on grounded neutrals.

If the generator neutral and frame were grounded by the use of driven pipes or inserted plates and a failure should occur on the main leads to ground, it is evident that the current would satisfy its circuit by seeking the path of least resistance to the ground pipes, as in Fig. 2. This path may be through the building structure, or it may be by way of conduit, or both.

It has been the practice of some engineers to prevent the flow of this stray current through the building structure by insulating the steel as much as possible and, wherever it is impossible to establish gaps between steel, they specify that the steel should be welded.

The idea of insulating against voltages that are usually used in substations and generating stations seems impractical. It must necessarily be a tedious job, besides costly, to carry out such system of control. The most discouraging thing about such a scheme is that after all the precautions are taken it would seem that there still exists the uncertainty of not accomplishing what was set out to be achieved. On the other hand, even if it were possible to establish sufficient resistance through the building structure, there still exists the danger of an excellent return path being formed by the secondary wiring and its system of conduits. Thus for absolute protection to all equipment it would seem that there must be a path of extremely low resistance established independent of the building structure.

Before the general adoption of the modern method of relaying, it no doubt was preferable to isolate the bus as much as possible from ground, perhaps at the cost of safety of the secondary equipment. The operator was usually protected by rubber mats and other insulating materials placed in front of the control boards.

For the best operation of relays, especially for trouble at the station, such as differential protection of transformers and generators, it is important that a network of extremely low resistance be distributed in the proximity of the main bus and generator leads, thus creating those conditions under which the relays can function most efficiently for all cases of trouble.

A practical way of accomplishing this is to tie the neutral and frame of

generator or condenser to a conductor of approximately 75 per cent of the carrying capacity of that of the main leads, extending this lead to all parts of the bus structure and, if the generator feeds a transformer bank, tying it also to the transformer cases, as in Fig. 3. If generator leads are carried in ducts, it is advisable to carry the ground control cable near the leads in a separate duct. On open bus work it is convenient to mount the bus supports on steel insert plates which are bonded to the ground-control cable.

If there are feeders off the generator bus, it is advisable to tie this network to a ground well or a series of driven pipes. On jobs where the generator is directly connected to transformers it is not necessary to establish grounds other than those which are usually established for the high voltage side.

As far as failures on the generator and the low-tension side of the transformers are concerned, the ground circuit is completed through the network and any connection to earth would be only incidental. Since the network on the high side of the transformers is grounded, the common tie between the two networks on the transformer cases makes further grounding unnecessary.

The switchboard equipment, such as grill work, pipe framework and instrument cases, should be tied together and run to a comparatively high resistance ground located just outside the switchboard control room. This ground usually consists of a few pipes driven into the earth.

The object of isolating the control-board ground is to establish a higher resistance through the control board to ground than that which exists through the network.

The foregoing principles were adopted and applied on the Edison 220-kv. program and are now being applied on all of the new substation designs. Previous to this, little time was given to the correct analysis of the ground design and, as the result, some difficulties were experienced.

The fact that during two years of experience with 220 kv. there has not been the slightest indication of high voltage on the non-current carrying structure leads the author to believe that the foregoing principles are very nearly correct.

Card System Used for Protective Equipment Records

Adequate records pertaining to the operating history of all protective relay equipment on a system are essential to the satisfactory operation of this equipment. The old, original system, if it may be graced with that title, was purely a cut-and-try proposition, and no records of any consequence were kept covering the operating history of the equipment that will be an aid to judgment in making subsequent changes in settings and adjustments.

Under present-day operating conditions immense blocks of power are involved, and systems are necessarily complicated by interconnection and parallel operation. It is of value to the protection engineer to be able to refer to a card and tell at a glance just what different settings and current transformer ratios had been in service on some particular circuit and just when they had been changed. Knowing this and knowing in a general way what the system operating conditions have been at various times, it is possible to make a more judicious selection of a setting to accommodate whatever new conditions may be arising, or to correct unsatisfactory operations.

The Southern California Edison Company's protection engineering department has devised and standardized for this purpose the forms pictured in this article. The two forms shown are printed one on each side of a standard 4x6-in. file card, and are designed to contain not only information concerning the automatic protective equipment but all other information concerning any one particular circuit that might be of interest or value for future reference.

One card is used for each separate circuit at each station, except in those cases where two or more sets of protective relays are in service on one circuit as would be the case, for example, where a transformer bank was protected by both overload and differential relays. In cases where there are two or more sets of relays on one circuit a card is made out for each set.

In order to facilitate selection and segregation, cards of different colors are used for lines or circuits of different voltages. Blue cards are used for

FORM G.O. 71. 1924
SOUTHERN CALIFORNIA EDISON COMPANY

PROTECTIVE EQUIPMENT RECORD

STATION_____ CIRCUIT_____ PROTECTION_____
KV_____ CYCLES_____ KVA_____ AMPERES_____ % IMP._____ CIR. BR. OP TIME_____
CIRCUIT BREAKER:_____ TYPE_____ KV._____ AMPS._____ RUPT. CAPY._____ AMPS. AT_____ KV
CUR. TRANS:_____ TYPE_____ KV_____ VA_____ RATIO_____ CONN._____
POT TRANS:_____ TYPE_____ KV_____ VA_____ RATIO_____ CONN._____
RELAYS:_____ TYPE_____ VOLTS_____ AMPS_____ SECONDS_____ TRIP_____ CONN._____
STYLE NOS. A_____ B_____ C_____ REACTORS:_____ KV._____ % _____ AT_____ AMPS.
AUX. RELAYS_____ TYPE_____ NO. CONTACTS_____ BATT. CHRGR._____
LTG. ARRESTER:_____ TYPE_____ KV._____ GAPS: S_____" H_____" G_____" BATT._____ VOLTS

	REMARKS
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	(OVER)

Face of relay and protective equipment record used by the protection engineering department of the Southern California Edison Company. It is obvious that every space would not be filled out for any one circuit, but sufficient spaces are provided to make the one form usable for any installation. A space is provided for the recording of circuit breaker operating time, as it is planned to determine experimentally the actual operating times of the different classes of breakers in service as an aid toward securing selectivity with minimum relay time difference between adjacent stations. Spaces are provided for relay style numbers but not for relay serial numbers, as it was found that, from an operating standpoint, the style numbers were more valuable in identifying relays.

RELAY SETTINGS

	SETTING DESIRED						SETTING OBTAINED								REMARKS
	DATE			C. T. RATIO	CUR. TAP.	TIME SECS.	DATE			MIN. TR AMPERES	CUR. TAP.	SECONDS AT		C. T. RATIO	TIME—SECS. TO CLOSE RELAY CONTACTS
	MO.	DAY	YR.				MO.	DAY	YR.			300%	1000%		
1															
2															
3															
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Reverse side of protective equipment record card used by the Southern California Edison Company showing the spaces provided for entering twenty successive changes in settings. Under ordinary operating conditions a card will last several years, thus affording a continuous historic record. When a letter requesting a change in setting is sent to the test department, the data are entered in the space under "Setting Desired," and when the report of the completed test comes back from the test department the information on it is copied into the space under "Setting Obtained." Both entries are found to be necessary, for sometimes field conditions prevent the making of the actual setting requested.

circuits of 150 and 220 kv., salmon-colored cards are used for 30- and 60-kv. circuits. Buff-colored cards indicate 11,000- and 15,000-volt circuits, while for everything under 11,000 volts a white card is used. Of course the voltage ratings given are merely nominal ratings.

When these cards were installed as the official record of protective equipment, great effort was made to make them immediately as valuable as possible. Old records, consisting of report sheets from the test department, correspondence and the less complete cards that previously had been used were carefully gone over, and all settings which could be verified satisfactorily were transferred to the new cards. An effort was made to obtain wherever possible a continuous record dating back to the time that the circuit was installed, or at least back to the time when the circuit assumed prominence or was equipped with induction relays, as the case might be. Previous cards had contained only current information, and it had been necessary to do more or less research work every time it was desired to find information concerning previous settings.

The work involved in establishing a complete file of these new cards covering practically every circuit on the system was heavy and tedious. Nevertheless, its worth has been proved, and the design is such that the work necessary to keep the cards up to date has been reduced to a minimum.

Posting Meter Constants Helps to Maintain Confidence

By W. T. RYAN,
Industrial Engineer, The Washington Water Power Company, Spokane, Wash.*

In our contact with our customers, particularly those who use power for industrial purposes, we have noticed frequently the suspicion with which they regard electricity and any individuals who deal with the subject. Such a state of mind is usually evidenced by questions raised in regard to our bills and rates. It is easy to help the customer to understand how his bill is figured and how the cost per kw-hr. can be decreased by a greater number of hours' use of a given demand, but it is a serious mistake to stop there. At that point the big thing in his mind is the amount of money in dollars and cents that he is paying to us each month. We must go further; we must create in his mind a definite conception of what he is receiving for his money, and of its value to him as measured in useful work performed in his plant. Having established such a conception, it is easy to take one more step and make the customer feel that our principal concern is not what we can get out of him, but rather how much we can give him for his money in the way of service.

As a means to this end we have been furnishing the more important customers with a blue print, reproduced herewith, which gives all the data necessary to enable anyone to read the meters and to calculate the load in horsepower at any time desired. This is posted near the meters, and the method of making the computations is thoroughly explained to the man in charge. This places us in the position of having laid our cards on the table.

By giving such information on simple, fundamental ideas in mechanics and electricity, the customer's resistance can be overcome, and after his doubts and suspicions have been removed it is possible to establish his confidence in our company.

*Extract from paper by W. T. Ryan, industrial engineer, The Washington Water Power Company, Spokane, Wash., read at employees' meeting.

Name of Customer

.....

DIRECTIONS for Determining Kilo-volt amperes (K.V.A.), Kilowatts (K.W.), Horse Power (H.P.), and Power Factor (P.F.).

From Graphic K.V.A. Meter # ..15.....

Chart Reading x ..80.... = K.V.A.

From Integrating K.W.Hr. Meter # 4329...

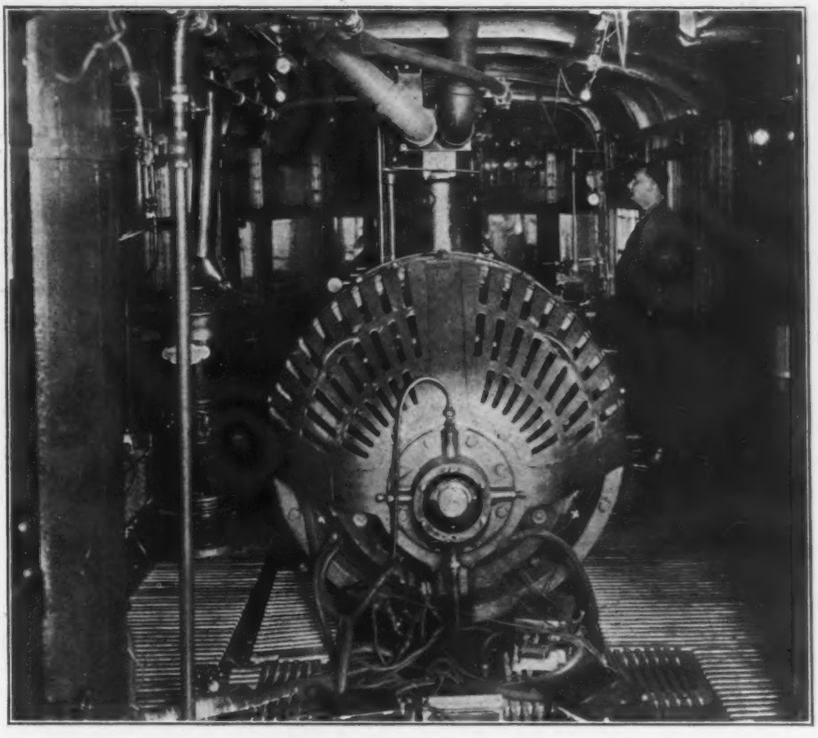
$\frac{\text{No. Rev. of Disc}}{\text{Time (in Sec.)}}$ x 3.6 x ..144.... = K.W

$\frac{\text{K.W.}}{0.746}$ = H.P.

$\frac{\text{K.W.}}{\text{K.V.A.}}$ = P.F.

The Washington Water Power Co.

Showing blue-printed form used by the Washington Water Power Company to acquaint customers with meter constants



Interior view of new oil engine electric locomotive showing 200-kw. generator direct connected to 300-hp. oil engine. The locomotive, designed for switching purposes, was built jointly by the General Electric Company and the Ingersoll Rand Company.

IDEAS FOR THE CONTRACTOR

Home-Lighting Program Presented to Parlor Club

Unusual Demonstration and Exhibit Staged by California Dealer Proves Big Success and Builds Business

BY J. U. BERRY
Advertising Manager, Valley Electrical Supply Company, Fresno, Calif.

On Nov. 20 the Valley Electrical Supply Company, Fresno, Calif., staged a home-lighting program for the ladies of the Parlor Lecture Club. The lecture was unique in character and presentation.

H. E. Cook, lighting specialist from the Lighting Service Bureau of the Edison Lamp Works of the General Electric Company, Schenectady, N. Y., was retained to deliver the lecture. His address proved intensely interesting and educational and was followed by much favorable comment from the audience.

The stage in the auditorium of the Parlor Lecture Club was specially decorated for the occasion. Wall brackets mounted on wall board plaques, which were covered with wall paper, were suspended from the moulding of the back wall of the stage. These were hung in front of strips of dark red velour which was draped from the moulding to the floor, lending an artistic and pleasing effect. One of the wall brackets was shown without shades and the other with parchment shields in order to make a comparison of glaring lights with that of shaded soft and restful light.

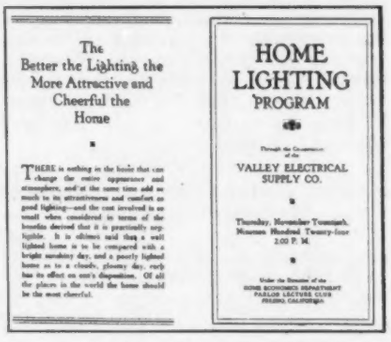
Suspended from the ceiling in the center of the stage directly over a dining table, spread with a white cloth, was a beautiful decorative glass-dome dining-room fixture to illustrate the correct lighting of the dining table and room. On each side hung candle fixtures, one with glass shades showing the absence of glaring lamps, the other without shades, emphasizing glare. On the right-hand side of the stage was an easel with lighting charts which Mr. Cook used in illustrating his talk on home lighting. The charts consist of pen and ink drawings taken from actual home settings where both correct and incorrect fixtures were in use.

The left-hand side of the stage setting consisted of a floor lamp with silk-lined fringed shade and a special rack with an assortment of glass shades in the very latest designs and shapes. Both frosted and colored lamps were used with these shades to show the various lighting effects obtainable. In the floor lamp a frosted lamp was shown, together with a clear lamp. Here Mr. Cook pointed out to his audience the desirability of using the frosted lamps, since it was possible to see the filament of the clear lamp even through the silk lining and fringe of the shade.

After the conclusion of the talk, an open discussion brought out many interesting phases of home lighting, and numerous questions were answered by the speaker.

Several musical numbers and refreshments were features of the program. So successful did this meeting prove that it has led us to making plans to put on a similar educational campaign on a much larger scale in the near future.

Though most people use electric lights every day, but few have any conception of what real lighting comfort is or means to them. Therefore it is felt that in staging a home-lighting educational campaign on a larger scale it will result in a much better understanding on the part of the housewife as to the proper types of lighting adequate to home needs.


The Better the Lighting, the More Attractive and Cheerful the Home

THERE is nothing in the home that can change the entire appearance and atmosphere, and at the same time add as much to its attractiveness and comfort as good lighting—and the cost involved is as small when considered in terms of the benefits derived that it is practically negligible. It is almost said that a well lighted home is to be compared with a bright sunshiny day, and a poorly lighted home as to a cloudy, gloomy day, each has its effect on one's disposition. Of all the places in the world the home should be the most cheerful.

HOME LIGHTING PROGRAM

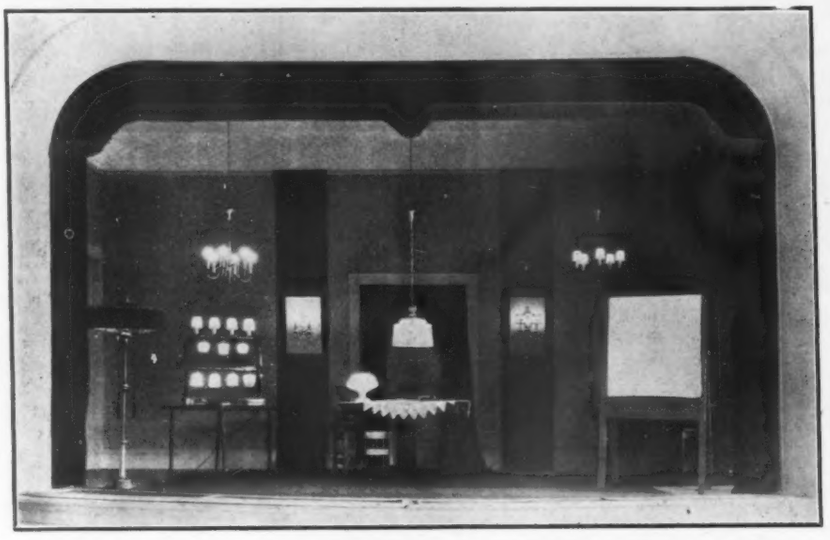
Through the Courtesy of the
VALLEY ELECTRICAL SUPPLY CO.

Thursday, November Twentieth, Nineteen Hundred Twenty-four 2.00 P. M.

Under the Direction of the HOME ECONOMICS DEPARTMENT PARLOR LECTURE CLUB FRESNO, CALIFORNIA

Program used by Valley Electrical Supply Company at lighting demonstration exhibit before Parlor Lecture Club.

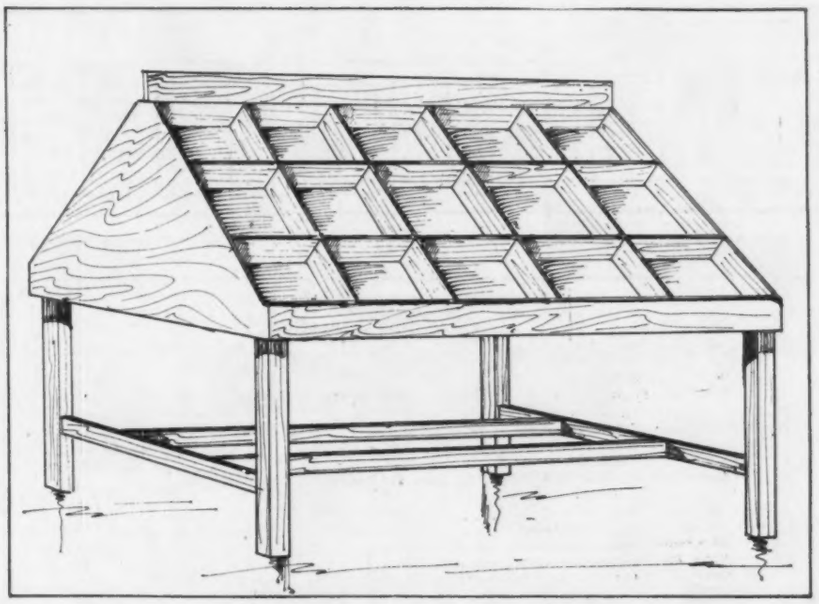
The important factor in the success of a program of this character is proving to the hearers that it is not necessary to sacrifice harmony and decorative beauty in the selection of lighting fixtures in order to effect economy and obtain the desired comfort-giving lighting results. Such a program may be staged to advantage by electrical dealers everywhere and form an excellent follow-up of the Better Lighting Contest recently conducted.



Demonstration exhibit used by the Valley Electrical Supply Company, Fresno, Calif., at the auditorium of the Parlor Lecture Club of that city, to show the value of good lighting and to illustrate the adaptability of various types of lamps and fixtures.

A Handy Yardstick for Measuring Lamp Cord or Small Wire

Many dealers have been bothered to find a handy method of measuring silk lamp cord and the smaller sizes of wire, such as are often sold in small quantities. One convenient way to measure this stock is to mark off on a shelf or counter, or even on the top of a drawer, half-inch measurements up to one yard. This permits of measuring the wire without removing the spool from the drawer or rack and helps to keep the stock in good order. It also speeds up the service to the customer and thus more quickly releases the clerk for service to others.



Handy display case for showing smaller and more commonly used electrical devices. Label holders may be used and cards inserted showing the name of the device and its price. This display case may be made at very little expense from an old table and forms an excellent sales help for increasing volume on fuses, attachment plugs, sockets and other small items.

Take a Lesson From the Ten-Cent Store Merchandiser

The ten-cent store sells its merchandise because it is continually on display and because the prospective customer can see what he intends to buy. Also he sees many items that he can use but which have not occurred to him as needful purchases until he sees them on display while passing through the store. A merchandising help adopted by this type of store is the table display. This display is merely an arrangement of small bins on top of a table, each bin containing a different item and all items clearly marked as to price. This offers an excellent means of displaying small electrical goods, such as sockets, attachment plugs, two-light clusters, etc. If the goods are marked with their name and price, the customer is able to know the designation of each article in which he is interested and also to see in advance what it will cost. If the price is agreeable, the sale is made in his mind without effort on the part of the clerk.

This type of display has worked out well for many electrical dealers and has been the means of increasing many fold their sales of fuses and other smaller devices in common use in the household.

ELECTRICAL WORK BY
MILLER ELECTRIC CO.
2528 CRIST ST., ALAMEDA
PHONE ALAMEDA 2841
MEMBER OF
California Electragists
"Your Assurance of Safety"

Typical job sign designed by Walter F. Price, executive secretary California Electragists, San Francisco, Calif., for the exclusive use of members of that association. These signs may be used only by Electragists and are sold to members at low cost.

National Electrical Code to Be Issued Again in 1925

There will be a 1925 edition of the National Electrical Code, the rules and regulations for electric wiring and apparatus. This was determined at a meeting of the reorganized sectional electrical committee of the National Fire Protection Association, held in New York City on Friday, Nov. 21, 1924.

Inspection and regulatory bodies, manufacturers, utilities, property owners, users or others who have proposals for additions or other amendments to the National Electrical Code, edition of 1923, can be assured of full consideration if these proposals are submitted in writing to the chairman of the committee, A. R. Small, 109 Leonard Street, New York, N. Y., not later than Dec. 15, 1924. Such proposals should preferably refer to a particular article and paragraph of the 1923 edition, and shall in all cases be readily identifiable as to the name, address and interest of their submitters. When so filed, such proposals will be referred at once to the appropriate article subcommittee for detailed study. The sectional electrical committee will meet Feb. 17, 18 and 19, 1925, to receive and act upon reports from the article committees and to determine upon its report to the annual meeting of the National Fire Protection Association to be held in Chicago, Ill., in May.

Electragists Elect Members of Executive Committee

The following members of the Association of Electragists International have been elected executive committeemen:

Eastern division—W. Creighton Peet, New York City (one year).
Great Lakes division—Ernest McCleary, Detroit, Mich. (one year).
Southern division—Joseph A. Fowler, Memphis, Tenn. (two years).
Central division—A. Penn Denton, Kansas City, Mo. (two years).
Mountain division—E. C. Headrick, Denver, Colo. (one year).
Pacific division—Clyde L. Chamblin, San Francisco, Calif. (two years).
Western Canadian division—J. H. Schumacher, Winnipeg, Manitoba (one year).
Eastern Canadian division—R. A. L. Gray, Toronto, Ontario (two years).

The election occasioned only two changes in the committee's personnel, Ernest McCleary succeeding Leslie G. Ross, Superior, Wis., as the representative of the Great Lakes division, and J. H. Schumacher succeeding C. C. Carter, Vancouver, B. C., as representative of the Western Canadian division.

Make Your Wiring Jobs Advertise and Create Future Sales

One means employed by many progressive contractors to secure leads and future business is to place a tag on the fuse board or on the fixtures of every job they wire reading in substance as follows: "This building was wired by Blank Electric Company. For future electrical supplies or wiring call them at telephone number 123."

This tag may be either of etched metal screwed to the meter board or may be of cardboard fastened on with a string. It has often proved of value in bringing in inquiries that have led to the sale of appliances, additional outlets and other electrical devices.

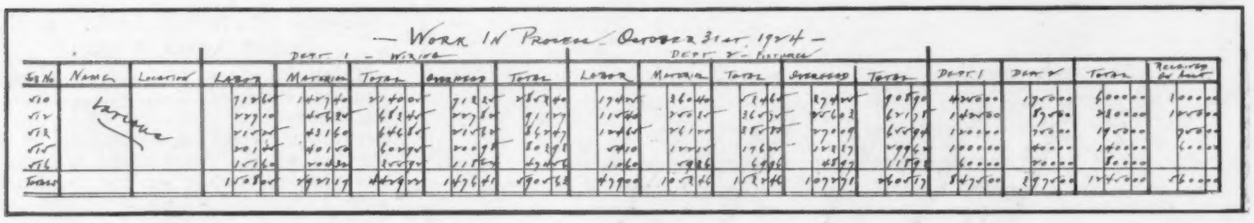


Fig. 1.

Practical Accounting for Contractors and Dealers

BY F. V. MITCHELL

Fig. 1 contains an illustration of the Work in Process Statement prepared at the end of the month, as outlined in the Aug. 15, 1924, issue of the Journal of Electricity. The totals appearing on this statement are used in the compilation of the Summary as outlined in Fig. 2. The preparation of this form was also thoroughly explained in the Aug. 15, 1924, issue.

The following monthly closing journal entries are made from the totals appearing on accompanying Summary.

Description	Acct. No.	Dept. No.	Dr.	Cr.
Cost of Goods Sold—Material	52A	1	$2,719.12	
Cost of Goods Sold—Labor	52B	1	1,496.15	
Work in Process Account	15	1		$4,215.27
Material and labor cost of wiring jobs finished during October, 1924.				
Cost of Goods Sold—Material	52A	2	930.95	
Cost of Goods Sold—Labor	52B	2	471.20	
Work in Process Account	15	2		1,402.15
Material and labor cost of fixtures jobs finished during October, 1924.				
Cost of Goods Sold—Overhead	52C	1	1,405.09	
Cost of Goods Sold—Overhead	52C	2	981.51	
Work in Process Account	15	1		1,405.09
Work in Process Account	15	2		981.51
Overhead on wiring and fixtures jobs finished during October, 1924.				

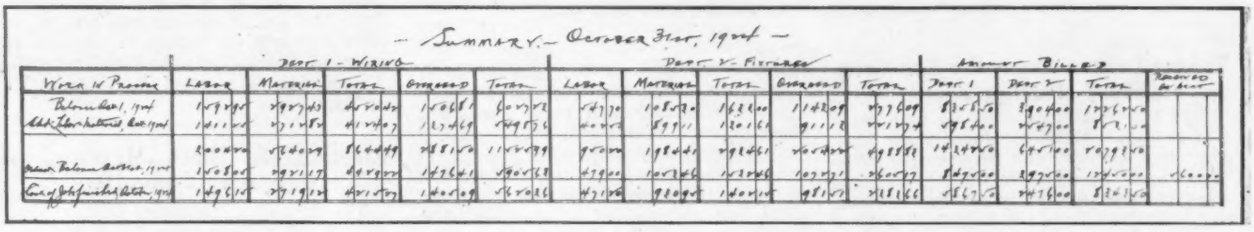


Fig. 2.

This Dealer Carries His Store to His Customers' Homes

An electrical contractor-dealer, located in a small Western town, whose business is largely done in the country and with ranchers and others far from town, has adopted a novel and successful scheme for increasing his sales. He has taken a small light truck of popular make and has fitted up a special cabinet arrangement for containing various small appliances that sell readily in his store. His stock on the truck consists of electric irons, toasters, a popular-priced percolator, extension cords, sockets, attachment plugs, Mazda lamps of all of the most popular sizes, and circulars of other devices. He never leaves his store without a complete assortment of goods, and he seldom returns without having made a sale. In addition to the stock carried on the truck, the circulars help him to sell washers, vacuum cleaners, ranges, pumping outfits and other heavier devices. Lately, by carrying a radio set and batteries for its operation, he has worked up a considerable volume on this line and this has been done with scarcely appreciable increase in overhead expense. The delivery expense may be considered as very low, as the truck would have to make the trip for other business, and the goods are delivered right from the truck.

The sales of lamps from this truck have nearly paid the fuel and oil costs, and this dealer feels that he has not yet reached his maximum possible volume. During the period just before the holiday season he carries samples of special merchandise, such as portables, and literature on floor lamps and toys, as well as other merchandise that is especially of a holiday nature. Electric range sales have been made as a result of having descriptive circulars on the truck, and more than one pumping outfit sale is attributed to the same procedure.

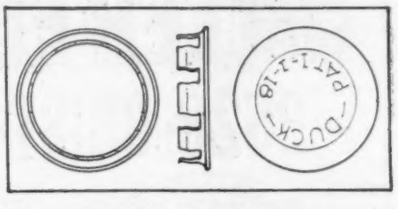
Dealers who are similarly located may be able to profit by this plan, which has the advantage of requiring very little investment in truck equipment.

Do You Sell Radio Engineering or Radio Entertainment?

Radio is necessarily a highly technical subject, but the customer is not ordinarily interested in its technicalities. All he wants a radio set to do is to work satisfactorily and with the least manipulation. Too many dealers are selling wave lengths, regeneration and construction of circuits rather than the service and pleasure that radio can bring. Prospective customers become confused at the use of a lot of technical terms that they do not understand and turn away without buying, feeling that a radio set is too complicated for them to handle. Dealers who sell the service of a radio set and not its technicalities are benefiting in sales volume, while those who deal in engineering terms are impeding their own progress on this line.

A Device for Plugging Up Holes in Knock-out Boxes

Electrical contractors have often found it necessary to plug up the knock-out hole in switch boxes. In the past it has been common practice to take two pieces of tin and fasten them together, one on each side of the box, thus covering the hole. This necessitated drilling or punching two holes and fitting a bolt for reassembling, all of which involved considerable time and added to the cost of the job. A new device to take care of this feature of electrical construction has been brought out by J. J. Duck, Los Angeles, Calif., and is sold under the name of Duck snap-in blanks. The device is a metal stamping with spring edges, so constructed that all that is necessary is to snap the duck into the blank hole. Ducks are furnished in one-half and three-quarter-inch sizes to fit standard openings and knock-out boxes.



Front, back and side views of duck for snapping into holes and knock-out boxes.

L	T	■	C	H	A	R	G	E	■	D	T
A	■	F	■	B	C	A	R	■	E	■	A
M	H	O	S	■	B	D	■	S	N	A	P
P	A	R	■	Q	U	I	T	■	G	P	S
■	■	M	I	S	S	O	U	R	I	■	■
S	H	U	N	T	■	■	B	A	N	K	S
E	E	L	■	■	■	■	■	■	E	V	E
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A	I	E	E	■	P	I	■	A	R	E	A
P	R	■	G	R	O	V	E	S	■	Z	R
H	■	N	■	■	C	E	■	■	S	■	A
O	P	E	N	■	H	T	■	B	E	L	T
R	■	G	U	Y	■	■	O	U	T	■	O
E	E	■	T	R	U	N	K	S	■	R	R

Answer to cross-word puzzle, devised by Claude W. Mitchell, electrical engineer of the Board of Fire Underwriters of the Pacific, and published in the Jan. 1 issue of the Journal of Electricity.

Prices Clearly Shown on Tags Help Appliance Sales

Most people like to know the cost of an article in which they are interested. It is only human nature to want to be able to pick up a percolator or toaster or other electrical appliance and to know without asking what its selling price may be. Many dealers have taken advantage of this fact and have made wide use of price tags, but there are still countless stores wherein it is necessary to ask the price of every article in the place. This often causes embarrassment to the prospect and not infrequently acts as a sales impedance, for there are many persons who will not inquire. Every such one means the loss of a possible sale.

Price tags are very low in cost and very high in value, especially if the prices are plainly marked in figures and not in code. Wherever code is used a feeling of distrust and suspicion is liable to be occasioned and the prospect's feelings are liable to be hurt. Many manufacturers furnish, at extremely low cost, price tags that bear on one side an advertisement of their goods and on the other side have provision for showing the selling price of the article to which attached. Such tags not only help to sell the appliance or device to which attached, but they also serve to create interest in the article advertised. These tags are often furnished in unique and distinctive shapes and colors and thereby lend an added attraction to the display.

San Francisco Contractors Will Hold Annual Dinner

The San Francisco Association of Electrical Contractors and Dealers will hold its annual dinner at the Hotel Whitcomb, San Francisco, Calif., on the evening of Saturday, Jan. 17, at 6:30 o'clock. The dinner will be entirely informal, and the usual care has been taken to make the affair successful. Arrangements are under the direction of the following committee: Gus Baracco, Victor Lemoge, Ed Dowd, Walter Mobley and Dave Carson. The attendance this year is expected to exceed that of any preceding year, and an exceptional program has been provided by the committee.

A Piece of Black Velvet Helps in Appliance Sales

One big help in appliance sales is a piece of black velvet for spreading on the counter under the appliance to be shown. The sharp contrast between the highly polished nickel of the appliance and the black sheen of the cloth shows off the appliance to excellent advantage and adds to its attractiveness. It is desirable to show only one appliance at a time; that is, if a customer asks to see a percolator and then wants to look at a toaster, the percolator should be placed back on the shelf before the toaster is displayed. This prevents an appearance of littering up the display counter and removes the liability of confusing the customer. Many sales are lost by promiscuous scattering about of appliances.

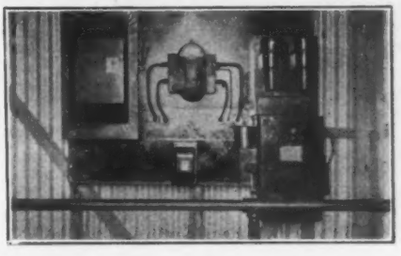
Another big help in maintaining the neat appearance of electrical appliances is a small piece of soft chamois. This should always be used to remove the perspiration and grease after showing the device and to polish appliances daily. Appliances retain their finish better when they are kept in glass-enclosed cases as they are then less exposed to dust and to atmospheric action.

Agricultural Wiring Conditions Show Notable Improvement

Although electricity has been used extensively in agriculture for several years, it is only recently that consistent attention has been paid to the matter of installation methods. In the earlier days it was not uncommon to ignore all of the ordinary hazards attending electrical installations, and exposed terminals were the common practice. Increased use of electric energy and the advance in the contractor-dealer's art have brought about many improvements in installation conditions, and today the normal agricultural installation is of as high quality as can be found.

Early installation in pump house. Note exposed switch and danger signs.

The accompanying photographs illustrate the different standards of installation employed in California agricultural applications. The improvement has been occasioned by the combined work of the central station, manufacturer, contractor-dealer, jobber and the California Electrical Cooperative Campaign. The recent installation pictured herewith is marked for the number of safety items taken under consideration. All switches are of the enclosed type, and wiring is in accord with all safety requirements. Protective relays are provided, switch boxes may be locked, and there are no exposed terminals. Perfect safety attends the operation of this installation and personal and fire hazards have been removed.



Recent installation on a California ranch. Note the extreme safety and lack of possible contact with hot wires or terminals.

BETTER MERCHANDISING

Selling Kitchen Lighting Units in the Spring

British Columbia Electric Railway Company Places Over 4,000 Units Despite Unusual Conditions

Proving that a kitchen lighting unit sales campaign can be successfully conducted in the spring months, the British Columbia Electric Railway Company, during April, 1924, sold more than 4,000 units to consumers on its lines. Another remarkable feature about the campaign was that despite

With the NEW LIGHTING RATES every housewife can enjoy
a
Daylight Kitchen
for only a cent a day
IN order that Vancouver homes might have the benefit of our new low rates which will soon go into effect we are making a special trial offer of the new
DAYLIGHT KITCHEN UNIT
which floods your kitchen with light, driving out gloom and enabling you to see even into the oven.
15 Days' Free Trial
We are offering our customers these units, complete with 100 watt lamp, on free trial for 15 days, absolutely without any strings. If satisfied you pay us
$8.50
(Regular price $12.00)
at the rate of 75c. a month, or $8.00 cash. No installation charge. If dissatisfied we take it out and replace your old fixture.
A Plug for Your Iron For two dollars extra you can have an overhead convenience outlet for your electric iron, so that you can do your ironing right under the light.
Why endure a dark kitchen when light is so cheap?
Under our new rates, Vancouver homes will pay 2 cents a kilowatt hour for light over a consumption of 3 kilowatt hours per 100 square feet. As this is the average normal consumption of current, any extra current used for appliances, porch lights, or kitchen units will almost certainly be at the 2-cent rate. On an average use of 3 hours a day, a 100-watt lamp will cost only 1 cent a day. You are probably using a 50-watt lamp today
Phone Seymour 5000 or nearest agency now and one will be installed in your home at once without cost
BRITISH COLUMBIA ELECTRIC RAILWAY CO.
Stores: 425 Carrall, 1138 Granville, New Westminster, Chilliwack, North Vancouver, Abbotsford, Bigel Vancouver

A new scale of lighting rates aided some in stimulating the sales of kitchen units.

the fact that a department store and electrical dealers offered other types of units at a reduced price in competition with the central station company, the sales drive was effective and when the competition was offered sales increased rather than decreased.

The campaign began during the last days of March as soon as fixtures, which were of the Miller type, could be obtained and it was definitely announced to close on April 30. The price was $8 cash or $8.50 on terms of 75 cents cash and 75 cents a month, including installation and a 100-watt lamp.

The question of whether to put the matter over until the fall of the year was debated before the campaign, but it was decided that effort put into a short campaign in the spring would be time gained and would make it that much easier to repeat the campaign in the fall. Results amply justified this decision as practically no resistance on account of the season was felt. In fact, independent dealers continued to sell daylight units long after the central station campaign closed on April 30.

A crew of twenty salesmen was recruited before the campaign and trained by E. E. Walker, sales engineer of the British Columbia Electric Railway Company. Some time was required for these men to get their bearings and before the less able salesmen could be weeded out. In a few days the crew was averaging total sales of 200 units while in the last few days sales increased to nearly 400 a day.

Advertising took the form of newspaper copy, car cards, posters and a broadside mailed to 20,000 customers. There was an instant response to the newspaper advertising, the first day bringing in seventy telephone orders.

Daylight Your Kitchen
BEFORE placing on the market its Daylight Kitchen Unit, the B. C. Electric investigated all fixtures and chose this unit because it was the best obtainable for the price.
We believed that the public wanted not cheapness but quality: a unit that would give the maximum value for the money; one that would not get out of order or go to pieces rapidly.
Here, then, are the points of superiority about the Daylight Kitchen Unit being offered by us:
1. Separate high-grade Lovelier switch, which is kept away from lamp socket, thus providing greater durability and length of life. The switch is the most delicate part of the fixture's mechanism. Our unit has a switch that is made to last.
2. Switch chain does not pass through hole in casing of fixture and thus does not wear either case or chain.
3. Lamp holder is firmly fixed and will not loosen with use. This is an extremely important point as the light may be switched on and off a dozen times a day and the unit thus be subject to constant jarring. Our unit is made as stated ther...
4. Our unit has only one thumbscrew holding glass in place, making it easy to replace globe.
Buying a kitchen lighting fixture is the same as buying an automobile. Whether you buy a Ford or a Cadillac, you get exactly what you pay for.
Make no mistake—buy a unit that will last; that will be as good two years hence as a month hence.
5. Our Daylight Kitchen unit is installed by qualified electricians, in accordance with city and municipal electrical inspection requirements.
6. Our price includes a 100-watt tungsten lamp, which is necessary to illuminate your kitchen properly.
7. You have 15 days' free trial with our unit. We make this offer because we know you will be satisfied and because we want only satisfied customers.
8. You may pay for our fixture at the rate of 75 cents a month, if you wish.
9. For $2 additional you may have a plug attached for your electric iron enabling you to iron right under the light.
If the price of the B. C. Electric Daylight Kitchen Unit is
$8.00 Cash
including 100-watt lamp, installed in accordance with electrical inspection requirements.
You may also have easy terms, the price being
$8.50
Telephone your order to Seymour 5000. Ask for Daylight Kitchen Department
BRITISH COLUMBIA ELECTRIC RAILWAY CO.
Stores: 425 Carrall St., 138 Granville St., Vancouver, New Westminster, Chilliwack, Abbotsford

The company used this type of advertisement to combat price competition

Previously to the opening of the campaign, "teaser" advertisements were run using the phrase "Daylight your kitchen," which was new to the territory. Approximately $1,800 was spent in advertising the campaign.

About the second week of the campaign a department store began to advertise daylight kitchen units at $5 but assuring purchasers that "any handy man can install them," this, of course, being contrary to civic regulations. The cost of installation being $1.50 and the cost of a 100-watt lamp being 75 cents, the real price of the competing unit was $7.25 as against $8 for the central station's unit. This department store made use of cuts and slogans similar to those of the central station.

Daylight Your Kitchen
15 Days Free Trial
of this white opal glass kitchen light, complete with lamp.
$8.50 installed
payable 75 cents a month, or $8.00 cash. If you don't like it we take it back at the end of 15 days and replace your old light. For $2.00 more you can have a plug for your electric iron.
This offer is good only to April 30. Act now. Phone
BRITISH COLUMBIA ELECTRIC RAILWAY CO.
SEYMOUR 5000 ANY SHOWROOM

Distinctive advertisements giving details of the purchase plan were used.

The immediate result of this was that many persons at first glance thought the central station unit was too high priced, but advertising was used immediately to explain the unit itself, pointing out the superior features and the small difference in price. Salesmen were instructed along the same lines, and as proof that price competition does not necessarily win, sales increased rather than decreased.

After the central station campaign closed, an electrical dealer in Vancouver advertised a fixture made by himself at $5, including a 100-watt lamp but not installed. A second dealer advertised a still cheaper fixture at $3.50.

This competition had a slight effect in increasing the cancellations under the 15-day free trial offer, but altogether not more than 10 per cent of the 4,200 orders received were canceled.

A factor in the success of the campaign was the announcement, previously made by the central station company, of the introduction on May 1 of a two-step rate for domestic consumers at 5 cents per kw-hr., dropping to a 2-cent rate for all current over 3 kw-hr. per 100 sq. ft.

Introducing Electric Refrigeration in Spokane

Washington Water Power Company Places Twenty Refrigerators in Representative Homes for Six Months Free Trial

Feeling that the next step in the complete electrification of the home is the general acceptance of electrical refrigeration, The Washington Water Power Company, Spokane, Wash., has undertaken a campaign to introduce the electrical substitute for the ice man in its Spokane district.

The load is an attractive one from the central station standpoint. The capacity of the individual units is small and

Let Us Tell You About
ELECTRO-KOLD
This is the new and modern system of home refrigeration that is being adopted by so many Spokane homes.
Home refrigeration—scientific and healthful care of food is something we are all interested in. For that reason you will be glad to follow us while we enumerate some of the advantages of "Electro-Kold":
Can be installed in any good refrigerator.
Economical, because motor runs only when needed.
A freezing compartment makes pure ice cubes for table use.
The same compartment will freeze fish, fowl, maintain them in perfect refrigeration for a long period of time.
Ice cream and frozen dainties can be kept from day to day.
The even temperature maintained below food-spoiling point allows you to keep all edibles a very long while.
The clean, dry, crisp, intense cold prevents dampness or the possibility of odors.
"Electro-Kold" produces pure and healthful refrigeration all the time, —without variation of temperature.
Sold for Cash or on Convenient Terms of Payment
Telephone Main 5171
and our "Electro-Kold" expert will be pleased to call at your home or place of business.
The Washington Water Power Co.
Telephone Main 5171
Corner Trent and Lincoln

The advertising campaign was largely of an educational character.

requires no extra investment on the power company's part for service. At the same time, it is practically a 24-hr. load, so that the total monthly consumption of the individual household is materially increased. An appliance which adds from $30 to $40 yearly to the revenue from domestic consumers, without additional expense in rendering the service is well worth adding to the lines.

The electric refrigerator on the other hand is a device which is little known to the public and in consequence there is not much natural demand for it at the present time. The Washington Water Power Company started in therefore with almost a fresh field for cultivation.

Naturally, the first question to be decided was the choice of equipment. Because it was felt that the public felt a certain amount of mistrust in refrigerator equipment, fearing that it was too complicated for a layman to handle and therefore liable to get out of order, necessitating delays and expense in repairs, locally manufactured equipment was chosen. The device was very simple in design, of the type which can be installed within the ordinary refrigerator, with few elements which could possibly cause trouble and had the advantage of having the factory near at hand, so that there need be no delay in case replacement of parts or major repairs for any reason became necessary.

The first thing necessary in the campaign was the creation of public interest. Newspaper advertising was of course the first method used. The campaign was not being pushed at this time, so that no concentrated broadside of advertising was focussed on this one subject, but occasional advertisements covering the virtues of electric refrigeration were run, and electric refrigerators were kept in display in the company's store. Some few refrigerators were sold on this basis.

Recognizing that nothing sells electrical equipment as will the equipment itself already in use and that the satisfied customer is the best salesman, the company introduced the refrigerator into twenty selected Spokane homes. Representative men from all professions—doctors, lawyers, manufacturers, of the type whose homes might reasonably support the convenience of electric refrigeration, were selected and were approached with an offer to install the complete equipment in their homes free of charge. They were to have free use of it for a six months period. If, at the end of that time, they felt that electric refrigeration was indispensable to their comfort, they might then enter into a contract with the company for the purchase of the machine, on a time payment basis if desired. If the homeowner was not entirely satisfied, the refrigerating machine would be removed without cost.

The offer was a generous one and, coming, as it did, from a company of high standing, could not well be refused by the citizens approached. No difficulty was found in placing the twenty machines to the best advantage. The company enjoyed the additional revenue from these machines during the period they were in use, so that the experiment in itself was not without returns. The customer, on the other hand, did not have ice bills to pay during this period, so that the cost to him was slight if anything.

The major result, however, was the fact that the refrigerator immediately became a point of general interest in the home. Guests were taken out to see the new equipment and its performance was discussed in the home and outside of it. The complete story of electric refrigeration was told each housewife in whose home the equipment was installed—and she invariably pointed out these conveniences to those to whom she showed her new labor-saver.

One feature which was recommended wherever possible was to install the refrigerator at a height of about 18 in. from the floor. It was no longer necessary to keep the machine low on account of having to lift the ice, it was explained to the housewife, which made this convenience possible. The advantage of being able to sweep with comfort under the ice box, as well as see into the food box without stooping over needs no second explanation to the average woman.

The campaign up to the present time has been merely preliminary. A number of machines have been sold and others are still in use in Spokane homes and will probably represent later sales. Sufficient interest has been aroused so that inquiries are coming in of their own accord concerning refrigeration equipment. The company plans to follow this up with a later campaign pressing home the advantage thus won. Spokane now ranks highest of any city in the United States in the per capita use of electric ranges. The electric refrigerator may soon be added to the record.

Now Comes the Day of
Scientific Home Refrigeration at Small Cost
ELECTRO-KOLD
Can Be Installed in Any Good Refrigerator
Freeze Dainty Ice Cubes
The American home comes into its own. We now present a complete refrigeration plant that will give "home" the same results as larger plants do in restaurants, hotels or meat markets.
Electro-Kold refrigeration plants are inexpensive to own and to operate.
We would just like to have you talk to some of the satisfied folks who have had Electro-Kold systems installed in their homes.
Here are just four letters that you might like to read—and a list of other Spokane folks who would be only too glad to tell you the wonderful advantages of this new and inexpensive way of home refrigeration:
A Few Spokane Homes Where Electro-Kold Has Been Installed
The Washington Water Power Company
CORNER TRENT AND LINCOLN
TELEPHONE MAIN 5171
ELECTRO-KOLD FOR EVERY HOME
Electro-Kold Systems Sold In All Our Inland Empire Branches

Letters from well-known citizens using the refrigerator machines were used in the newspaper advertisements.

Fit the Store Layout to the Individual Business

Character of the Business Conducted Will Be the Determinant in Arranging Store Space to Best Advantage

By JOHN T. BARTLETT

Try to find in your state two electrical store-office-shop layouts approximately alike. You will find this order a difficult one to fill. Not so much because different varieties of retail locations are used, but because premises of approximately the same outside dimensions are so divergently arranged.

One does not fully realize the many possibilities in electrical store layouts until he has mentally or actually before him a dozen or more of them. Like the great variety of combinations possible in a modern lock, so, in adapting premises to a particular business, the dealer and contractor has choice of many different arrangements.

The thing of greatest importance is to make the layout most productive for the individual business done. Heeding this point, electrical dealers and contractors inevitably develop individual store layouts. Probably no other trade that leases retail premises is surrounded with conditions which create greater variation in efficient quarters.

Merchandising is the big thing with one firm, contracting the big thing with another. With a third, equal importance is given to both. One firm puts maximum attention on merchandising of appliances, washers and cleaners. Another features radio, and appliances are in the background. Still another man goes heavily after the fixture trade. Some firms make most of their money in contracting, and the important question is whether the jobs are large or small.

This only suggests the numerous factors, and the combinations of them, in the electrical trade that may influence layouts. When you walk into what seems to be a peculiarly arranged store, investigation will almost invariably reveal that the proprietor does an unusual sort of business. In conducting that business most successfully he has developed an unusual layout.

There are unusual things, to give an illustration, about the corner premises of Clark Rider of the Denver Electrical Company, Denver, Colo. If Mr. Rider has a glass display case and counter, it was not visible on the occasion of the writer's recent visit to his store. The room that is entered from the street is an office room, roughly 11x12 ft. There are two wide entrances from it to the adjoining rooms. There are two desks at the back of the office room, and a table is placed on one side of the room.

Before going further with description it should be explained that the Denver Electrical Company does a large business in fixtures. The electric sign over the store indicates that the firm is strongly interested in this department. There are fixtures in the ceilings of the display windows and others hanging from the ceiling of the office room. In other words, this is a firm specializing in electrical fixtures. If the store windows display appliances, it is a safe surmise that a high percentage of the stock carried is in the window. If something asked for is not in stock, it can be secured quickly from the jobber. The internal arrangement is based on fixture trade.

Mr. Rider uses two large rooms for the display of fixtures, each opening out of the office room. The room through the rear doorway is the "high class" room. The room through the side entrance is an exhibition principally for the buyer interested in lower prices. Both rooms are principally illuminated by artificial light. The "high class" room has no windows in the street side wall. The second display room also has no windows, the back of the display window being made solid except for a small doorway for decorating use.

This fixture dealer believes in putting before the inquirer a great variety from which to pick. There are several scores of fixtures suspended from the ceiling, while around the rooms are many wall fixtures.

Each fixture room is approximately 14x27 ft. The "high class" room has a large mirror in the side wall and an entrance at the rear of the basement. It has a 5½-ft. entrance to the second fixture room. A cabinet 3 ft. by 16 in. by 15 ft. along the side wall of the second fixture room is used for lamps.

In the rear of the moderate-priced fixture room is a room, 9x14 ft., used for stock. This room is large enough, as most of the Denver Electrical Company's stock is stored elsewhere. The shop, one of the smallest electrical shops in Denver, is 9x18 ft. and is behind the stock room.

Down the street half a block from the Denver Electrical Company is a much different layout, that of J. Fischer. This firm has no shop on the premises. The rear, given over to a shop in many electrical firms, is here occupied by a well arranged office, with flat and standing desks. The girl at one of the desks, having a view through to the store premises, is able to attend to routine duties while being ready to meet any customer that may call.

This is a small layout, and not over 700 sq.ft. are used. The width of the room is about 15 ft., and the room occupied by display cases and counters is roughly 24 ft. deep. Cabinets for the display of merchandise are on the left side as one enters, and two display cases are in line down the other side. At the front, occupying space between the display window and cases, is a settee for the comfort of visitors. The right side of the store and the back have wall cabinets and shelves. The office room at the rear is daylight-illuminated from the rear.

As readers have deduced, this is the layout of a firm with which contracting is the big interest, merchandising a minor phase. A small middle-of-the-block location is leased, and in this a third or more of the space is used for office purposes.

Down the street several blocks is Williams & Rose. This is an electrical store which went heavily into radio when radio first swept the country and when department stores, hardware stores and music stores proceeded to stock radio sets and parts. The reaction in Denver cleared the situation, with many dealers sacrificing what stock they had and dropping the line. Williams & Rose is one of the few Denver electrical stores which continued to stock radio. It is known among radio fans as a real radio store.

This special side of its business is apparent in window displays, which always contain much radio merchandise, and in the interior arrangement. The main room is roughly 18x40 ft. The street entrance is on the left side of the front. Display cases extend down the right side nearly to the rear, room being left at the end for a wrapping corner. A desk at the end sets out into the room, facing the front. In the right hand corner at the rear is a small private office.

For the first 18 ft. or so, show cases are filled with radio goods, with the same on the corresponding wall shelves. As the customer enters the store, he is quite likely to see directly ahead of him one of the expensive radio receiving sets in an elaborate cabinet. Down the left side is a cabinet of shelves, 3 ft. or so high, the front covered with green curtain material. Higher on the wall are wall fixtures, while other fixtures hang from the ceiling. The position of the desk at the rear enables the one employee to wait on trade and also attend to the routine office work.

Cahn-Foster is a Denver firm which for years has been heavily interested in merchandise. Several years ago the concern moved into a building bought and remodeled for its special purposes. This store has two windows, one on either side of the entrance. As the customer enters, there are show cases on either side of the room. Space in the center is used partly for the displaying of large appliances. Generous floor space is given to both the motor department, which is in the rear, and the shop located on the second floor.

The smallest store of an electrical nature visited by the writer was that of the Bergman-Dilley Radio Company in Denver. A retail coal office had more room than it wanted, so cut off a portion of the rear of the store room and made it into a store premise. This space is approximately 11 ft. square. The entrance has windows of unequal width on either side. Display cases are down the right side, with shelf and table space opposite. The desk is at the rear in the center.

All of the foregoing leads up to the general observation that the business of an elecarical contractor or dealer is properly the determinant of the plan of arrangement of the premises he leases. The variation in individual business enterprises is such that seldom will any two be just alike, if this principle is heeded.

In the general district of the electrical stores mentioned are a number of other electrical firms. At the present time Denver's electrical trade is well centered, in a section fairly convenient as regards the general public and where prevailing rentals are in a workable relation to the business done by this trade. Denver electrical contractors and dealers quite generally appreciate the fact that this grouping is a benefit to individual dealers.

Sacramento Owner Fully Electrifies Apartments

New Building and Home Remodeled into Apartments Are Fitted with Electric Equipment Throughout

One of the newest and most complete all-electric apartment houses to be opened in Sacramento, Calif., is the Leonard Apartments at 1019 H Street. The apartment house was built by the Albert Realty Company, headed by Harry Leonard. The structure was designed by Miss Irene Leonard, and represents the result of years of study and hard work. There are six three-room apartments and six four-room apartments. Many features regarded by a woman as essential to a complete small home have been embodied in these apartments. They are models of modern convenience and practically every conceivable want of the tenant has been taken into consideration.

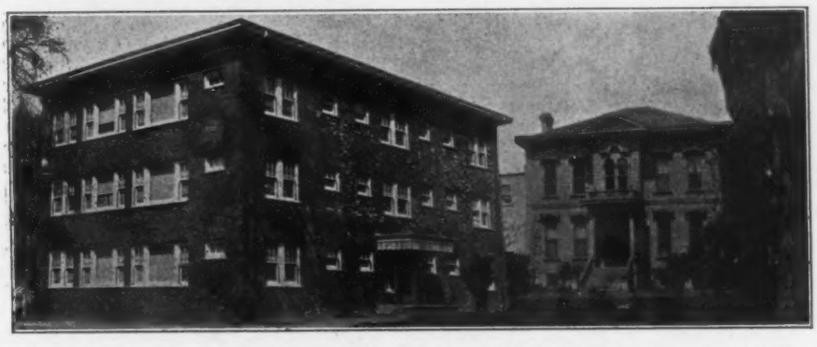
The kitchens in the Leonard Apartments have been designed to eliminate all unnecessary labor.

Before making these apartments completely electrical, the subject was gone into very carefully, and it was found that all the comforts, conveniences and cleanliness are to be had through electrical equipment with hardly any difference in the cost to the tenant. These apartments are equipped with Standard electric ranges and Wesix flush-type electric air heaters. Continuous automatic hot-water service is provided by a central Wesix automatic water heater and a 200-gal. storage tank. These were sold by F. W. Davies of the Great Western Power Company of Sacramento.

The kitchens are provided with plumbing connections and a convenience outlet in the proper location so that an electric refrigerator may be installed without any inconvenience.

The lighting was given special consideration, and the effect is most pleasing, the living room being provided with a five-light wrought-iron drop fixture, two candles and two brackets and a convenience outlet for attaching a floor lamp. The fixtures were made especially for the building by Clifford Prudhomme. The wiring was installed by Latourette-Fical Company. A duplicate building of like nature is planned for the future on the adjoining property.

The old Leonard home situated at the rear of the property was remodeled and made into completely electrical apartments, being equipped the same as the new apartments, except portable air heaters were used instead of the flush type. Service of a sufficient size to provide for the additional building was run to the main switchboard situated in the old home. The total load is on a master meter, and each apartment is sub-metered. A laundry is provided in the basement of the remodeled home. Miss Leonard has been highly complimented for her foresight and faith in making these apartments completely electrical.



The Leonard Apartments at the left and the old Leonard home, which has been remodeled into apartments, are completely electrified.

KNOW WHAT, WHY AND WHEN AND COLLECT THE YEN

By Joe Osier

Before John D. amassed a million he learned the lessons of work, thrift and proper investing; before the Wright Brothers learned to fly, they learned why they fell; before Jack Dempsey became world's champion, he fell heir to divers and sundry beatings and—

Before I finish this column I shall have organized and co-ordinated a set of head muscles which have been trained, after a fashion, to assist me in presenting an idea, to wit:

Before any man in any business succeeds and wins a wad, he must know his dance and strut it according to rote and rule. Failing in these particulars, he is sure, sooner or later, to be numbered among those of that unhappy group which merely gets by and which trembles as the first of the month approaches.

And when I say "strut his dance," I do not mean to be flippant or fresh. I mean this: He must know his business —his employees, his goods, his costs, his customers;

He must know what, when, how, where and why and he must be sure he knows or—

He will probably find the wreck of his undertaking about his ears and will be engaged in paying off first, second and third mortgages as long as there is a breath of life in his tired old carcass.

I know an electrical firm that dropped a fortune just recently because the heads of the concern did not know their costs and lacked the proper appreciation of the conditions pertinent to the contract and—

The man in the limelight watches his step.

They were stuck the minute they filed their bond.

And so, knowing the history of this particular case, I think, were I bidding on any job or contract, big or little, I would hasten slowly and know where I was going before I started.

There is too much by guess and by gosh bidding in these days of getting "back to normalcy," which undoubtedly explains why—

Bond houses are finishing jobs, sheriffs are working overtime and banks are returning checks marked N. S. F.— but—

Despite failures and foreclosure sales, it must be conceded that a business will thrive provided the man at the head of it holds up his head, keeps his eyes open and sails according to the lights set by those who have succeeded.

Yea, verily, the smart shall succeed and the dumb shall be smothered in the onions of ignorance.

NEWS OF THE INDUSTRY

Permits for 125,000-hp. Project in California Issued

The Federal Power Commission has authorized the issuance of a preliminary permit to W. H. Samson of Corning, Calif., covering a comprehensive water power and irrigation development in the Trinity River and tributaries and in the Sacramento Valley in Trinity and Shasta Counties. The proposed development involves the construction on Stuart's Fork of four storage reservoirs, having a total capacity of 20,000 acre-ft. Four power houses with an aggregate capacity of 20,000 hp. are to be constructed. It is proposed to construct a dam across the Trinity one mile below Stuart's Fork, which will create an additional reservoir of 600,000 acre-ft. capacity. Power house No. 5 is to be erected at this dam with an installed capacity of 16,700 hp.

The plan is to divert the water from the tail race of this power house through the Trinity-Sacramento Divide to power house No. 6, on Clear Creek, which is to have an installed capacity of 40,000 hp. A storage dam is to be erected in Clear Creek and the water taken from there to power house No. 7, where it is proposed to install 55,000 hp. Power house No. 7 is to be located on the Sacramento River three miles west of Redding. The water from that tail race will flow into the Sacramento and be used for irrigation at points below. The primary power which will thus become available will aggregate 125,000 hp. The commission inserted in the permit a condition that a flow of at least 20 sec.-ft. must be maintained in the Trinity River below the point of diversion.

Lewis River Company Is Denied Permit for Power Site

Officials of the Washington State Hydraulics Department have notified the Lewis River Hydro-Electric Company of Vancouver, Wash., that the company's application for a water right on the Lewis River in Skamania, Clarke and Cowlitz Counties, filed in June, 1921, has been denied. The denial also cancels the temporary permit held by the company, officials stated.

The action was taken because the company had not complied with statutory requirements in regard to development, it was pointed out. The Northwestern Electric Company of Portland is now doing preliminary work toward the construction of a plant on the North Fork of the Lewis River that will utilize the water in question.

According to the application filed some time ago by the Portland concern, a plant costing approximately $4,000,000 and having an estimated capacity of 60,000 hp. is to be constructed at a point near Yale in Cowlitz County.

Second Tie-In Proposed Between Washington Companies

A second connection between the systems of The Washington Water Power Company, Spokane, Wash., and the Pacific Power & Light Company, Portland, Ore., in central Washington, is contemplated in the 110,000-volt transmission line projected by the latter company between Hanford and Taunton. This line, which will be six miles long, has been surveyed, and the right of way for it has been acquired. It is expected that construction will start soon and that the line will be completed in the early spring. The conductors will be supported on two-pole wooden structures of H-type design.

In connection with this tie-in, a bank of three 3,000-kw., 110,000/66,000-volt, single-phase, General Electric Company transformers will be installed at Hanford, duplicating the present installation at Lind, Wash., which has heretofore been the single connecting point between the systems of the two companies supplying energy to the Pacific Power & Light Company's Yakima-Walla Walla power system at Pasco, Wash. The addition of this second connection will improve service conditions on that system and make it possible to take on additional load.

Proceedings of 1924 P.C.E.A. Convention Published

Bound copies of the Proceedings of the eighth annual convention of the Pacific Coast Electrical Association held at Coronado, Calif., June 17-20, 1924, have been prepared and will be distributed to the membership of the association after Jan. 15. The volume is bound in paper, and one copy will be sent to each member of the association in good standing.

One hundred cloth-bound copies of the Proceedings, suitable for use in permanent libraries, have been prepared and may be secured from S. H. Taylor, secretary of the Pacific Coast Electrical Association, 527 Rialto Building, San Francisco, for $1 each. As the supply is limited, requests for the cloth-bound copies will be filled in the order of their receipt.

The volume includes 256 pages devoted to papers and discussion presented at the convention and a 7-page memorial section dedicated to the late John A. Britton.

Preliminary Permits Extended.—An extension of one year has been authorized recently by the Federal Power Commission for the following preliminary permits: Crocker and Preston, Mokelumne River, California; The California Oregon Power Company, Klamath River, Oregon, and Ralph Bennett, Big Rock Creek, California.

Utility District Seeks Price of Great Western System

At a recent meeting of the directors of the Sacramento Municipal Utility District in Sacramento, Calif., action was taken toward securing from the Great Western Power Company a purchase price on its distributing system in that city. Previous action taken by the board in asking the purchase price of the systems of both the Great Western Power Company and the Pacific Gas and Electric Company was rescinded because the directors wished to avoid any controversy that might arise due to the recent decision of the supreme court in establishing the right of the California Railroad Commission to place a valuation on a public utility sought in purchase by a municipality.

The system is wanted for the distribution of future power planned to be developed upon the completion of the Silver Creek project, and the directors decided not to consider the purchase of the Pacific Gas and Electric Company's system because that would entail the necessity of buying also the system of gas manufacture and distribution and the street car lines of that company.

It was decided that a consulting engineer should be employed to advise the board on all electrical matters connected with the power end of the Silver Creek project and to take charge of the valuation of the Great Western system in case the city decided to buy it. The name of H. G. Butler, formerly with the California Railroad Commission and recently power supervisor in the southern part of the state during the power shortage, was suggested, and a committee was appointed to confer with him and report to the board.

Substitute for Bone Power Bill Being Prepared

A substitute for the Bone free power bill, which was defeated in the state of Washington at the last election, is being prepared for presentation at the coming session of the legislature, according to recent press dispatches. The proposed bill, which is sponsored by B. F. Jacobs, representative from Pierce County, authorizes cities to sell power outside their borders, with a 5 per cent tax on the gross proceeds of such sales. It effects a compromise between the Bone bill, which allowed tax-free sales, and the Reed bill, which would have imposed a 5 per cent tax on sales both within and without city boundaries, if any power were sold outside.

Salt Lake League Takes Larger Quarters.—The Rocky Mountain Electrical Cooperative League, Salt Lake City, Utah, has removed its offices to Rooms 215-216 Kearns Building in that city.

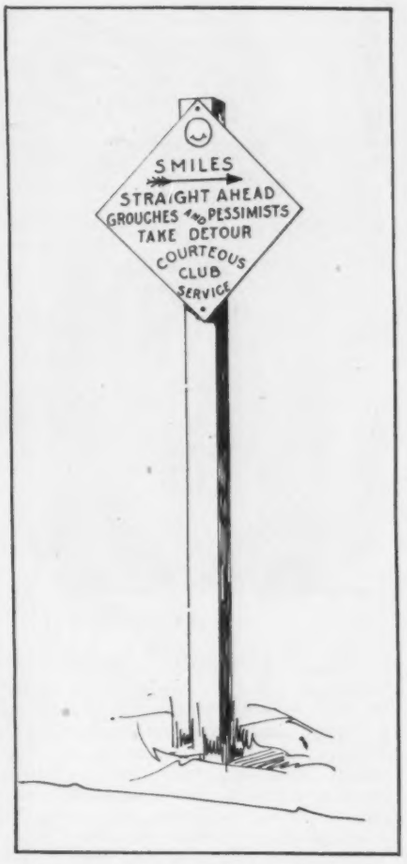
FRANCES PRATT

Winners in Smiles Contests Are Announced by Committee

Miss Frances Pratt of the consumers' department of the San Joaquin Light & Power Corporation, Fresno, Calif., has been adjudged winner in the slogan contest conducted by the Courteous Service Club Committee of the Pacific Coast Electrical Association. The winning slogan submitted by Miss Pratt in the Smiles Contest is "Faith moves mountains but smiles move men." For this slogan Miss Pratt received $10.

The first prize for the best story illustrative of courtesy on the part of an electric service company employee was awarded to W. G. Harold, light and power sales department of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C. The prize-winning story, for which Mr. Harold also received $10, follows:

"An elderly gentleman boarded a British Columbia electric car, with the intention of going to the postoffice to mail an important document, which he had already put into an envelope and addressed. On reaching the postoffice he got off the car only to find that the envelope was not in his pocket. Not knowing that he had lost the letter in the street car, and thinking he had lost it before he boarded the car and it had been picked up by some one, he went home thinking it was lost forever. Late the next day, to explain why it had not been mailed, he went to the office at which the envelope and document should have arrived if it had been mailed. He was greatly surprised to find that the document had already been mailed and had reached the office the day after it had been lost. On his way home he boarded the same car in which he had lost the document the day before and learned that the conductor had found the envelope, sealed it, put the necessary amount of stamps on it and mailed it."



Slogan submitted by J. P. Smith, Southern California Edison Company, Long Beach, Calif.

A special award of $10 was made to J. P. Smith, Southern California Edison Company, Long Beach, Calif., for the slogan which he submitted in the form of a road sign similar to those used by the California State Automobile Association and the Auto Club of Southern California. A sketch of the sign accompanies this article.

Second prize in the slogan contest went to H. A. Walker, Pacific Gas and Electric Company, Stockton, Calif. Mr. Walker's slogan was "Smiles go where grouches fear to tread." Third to sixth prizes, inclusive, went to the following:

Victor Baloun, Station E, Pacific Gas and Electric Company, San Francisco, Calif. "Pave the way with smiles."

C. W. Hughett, consumers department, San Joaquin Light & Power Corporation, Fresno, Calif. "Smile and serve."

C. W. HUGHETT

E. C. Van Buren, credit department, San Joaquin Light & Power Corporation, Fresno. "If backed with a smile, it's service worth while."

P. B. Garrett, general engineer, Westinghouse Electric & Manufacturing Company, San Francisco. "Smile and lead—frown and get left."

E. C. VAN BUREN

Second prize in the story contest was awarded to John W. Otterson, Journal of Electricity, San Francisco. Third to sixth prizes were awarded to the following:

F. A. Easton, San Joaquin Light & Power Corporation, Fresno.

F. G. Morales, construction department, Southern California Edison Company, Los Angeles, Calif.

Mrs. Ruth M. Williams, Southern California Edison Company, Los Angeles.

A. R. Eggers, Pacific Gas and Electric Company, San Francisco.

Approximately two hundred stories and slogans were submitted in the contest.

H. A. WALKER

VICTOR BALOUN

P. B. GARRETT

Committee Chairmen Named for 1925 N.E.L.A. Convention

Plans for the 1925 convention of the National Electric Light Association to be held in San Francisco during the week of June 15 have taken definite shape with the announcement of committee personnel by Frank A. Leach, Jr., president of the Pacific Coast Electrical Association.

Franklin T. Griffith, president of the National Electric Light Association and president of the Portland Electric Power Company, will be honorary chairman of the general convention committee. Wigginton E. Creed, president of the Pacific Gas and Electric Company, will act as chairman. There will be three vice-chairmen: James B. Black, vice-president and general manager of the Great Western Power Company; J. B. Miller, president of the Southern California Edison Company, and Samuel Kahn, vice-president and general manager of the Western States Gas & Electric Company. C. T. Hutchinson of McGraw-Hill Company of California will act as secretary of this body. The following will constitute the membership of the committee: R. M. Alvord, General Electric Company, San Francisco;

FRANKLIN T. GRIFFITH

P. S. Arkwright, Georgia Railway & Power Company, vice-president of the National Electric Light Association; M. H. Aylesworth, managing director, National Electric Light Association; R. H. Ballard, vice-president and general manager, Southern California Edison Company; William Baurhyte, president, Los Angeles Gas & Electric Corporation; T. E. Bibbins, president, Pacific States Electric Company; Henry Bostwick, San Francisco district manager, Pacific Gas and Electric Company; R. M. Boykin, manager, central district, Puget Sound Power & Light Company; George Campbell, manager, Truckee River Power Company; J. E. Cranston, Pacific Coast manager, General Electric Company; J. E. Davidson, Nebraska Power Company, vice-president, National Electric Light Association; P. M. Downing, vice-president, Pacific Gas and Electric Company; R. E. Fisher, vice-president, Pacific Gas and Electric Company; J. D. Grant, chairman of board, The California Oregon Power Company; C. E. Heise, San Francisco manager, Westinghouse Electric & Manufacturing Company; D. L. Huntington, president, The Washington Water Power Company; Frank A. Leach, Jr., vice-president and general manager, Pacific Gas and Electric Company; A. W. Leonard, president, Puget Sound Power & Light Company; L. T. Merwin, vice-president and general manager, Northwestern Electric Company; F. S. Myrtle, Pacific Gas and Electric Company; R. F. Pack, Northern States Power Company, vice-president, National Electric Light Association; J. F. Pollard, vice-president and general manager, Coast Valleys Gas & Electric Company; H. T. Sands, Chas.

WIGGINTON E. CREED.

H. Tenney & Company, vice-president, National Electric Light Association; M. W. Scanlon, Westinghouse Electric & Manufacturing Company; E. O. Shreve, San Francisco manager, General Electric Company; Guy M. Talbot, president, Pacific Power & Light Company; Samuel H. Taylor, secretary, Pacific Coast Electrical Association; W. G. Vincent, Jr., vice-president, Pacific Gas and Electric Company; A. B. West, president, The Southern Sierras Power Company; W. H. Whiteside, vice-president, Westinghouse Electric & Manufacturing Company; A. E. Wishon, general manager, San Joaquin Light & Power Corporation.

Officials of the executive committee will be: Frank A. Leach, Jr., vice-president and general manager, Pacific

FRANK A. LEACH, JR.

Gas and Electric Company, chairman; Wm. Baurhyte, president, Los Angeles Gas & Electric Corporation, vice-chairman; Samuel H. Taylor, secretary, Pacific Coast Electrical Association, secretary.

Other committee chairmen appointed are:

Budget—E. O. Shreve, General Electric Company, chairman; K. E. Van Kuran, Westinghouse Electric & Manufacturing Company, vice-chairman.

Construction and Equipment—P. M. Downing, chairman, and A. U. Brandt, vice-chairman, both of the Pacific Gas and Electric Company.

Entertainment—R. E. Fisher, Pacific Gas and Electric Company, chairman; D. E. Harris, Pacific States Electric Company, vice-chairman.

Hotels—C. E. Heise, Westinghouse Electric & Manufacturing Company, chairman; A. H. Nicoll, Western Electric Company, vice-chairman.

Personnel and Supplies—Henry Bostwick, Pacific Gas & Electric Company, chairman; R. A. Balzari, Westinghouse Electric & Manufacturing Company, vice-chairman.

General Transportation—R. M. Alvord, General Electrical Company, chairman.

Local Transportation—W. G. Vincent, Jr., Pacific Gas & Electric Company, chairman; F. H. Woodward, Great Western Power Company, vice-chairman.

Advertising—M. W. Scanlon, Westinghouse Electric & Manufacturing Company, chairman; J. Charles Jordan, Pacific Gas and Electric Company, vice-chairman.

Publicity—F. S. Myrtle, Pacific Gas and Electric Company, chairman; Al C. Joy, San Joaquin Light & Power Corporation, vice-chairman.

Local Registration—J. F. Pollard, Coast Valleys Gas & Electric Company, chairman; A. G. Jones, General Electric Company, vice-chairman.

General Information—J. B. Black, Great Western Power Company, chairman; A. E. Rowe, Garnett Young & Company, vice-chairman.

General Reception—T. E. Bibbins, Pacific States Electric Company, chairman; Clotilde Grunsky, McGraw-Hill Company, vice-chairman.

Hostesses—Mrs. Franklin T. Griffith, honorary chairman; Mrs. Wigginton E. Creed, chairman.

Subcommittee chairmen and further details of committee personnel will be announced at a later date.

Eastern Oregon Service Will Be Improved During 1925

Seventeen miles of transmission line between Union and La Grande, Ore., will be re-routed, according to the 1925 construction plans of the Eastern Oregon Light & Power Company. This will more than double the carrying capacity of the lines between the generating plants and La Grande.

Fifteen thousand dollars is expected to be expended at the South Baker steam plant to cover the erection of a fireproof building enclosing the turbine room, where a new turbine was installed in 1923, and in improving the equipment for handling the hog fuel used at this plant.

The high-tension switching equipment all over the system will be improved, but there will be little new work done at the four hydro plants. Over $15,000 was spent during 1924 on improvements and extensions to the distribution system, exceeding by more than 50 per cent the work done in 1923.

An increase of 30 per cent in the number of gas customers in Baker, Ore., will necessitate the building of a new gas holder in that city.

Cramp Company to Build Turbines for Cutler Plant.—The Phoenix Utility Company has awarded to the William Cramp & Sons Ship & Engine Building Company a contract for two 21,500-hp. vertical I. P. Morris turbines complete with governors and auxiliaries for the installation in the Cutler plant of the Utah Power & Light Company. These units will be somewhat similar to those now being built by the Cramp company for the Merced Irrigation District of California, where two 24,500-hp. turbines will be installed. The Cramp plant is also completing a contract for three 13,000-hp. vertical Morris turbines, together with governors, intake pipes and penstock valves, which will constitute a part of the extensive superpower development of Japan.

Miss Julia Sutherland Groo, winner of the National Home Lighting Contest, receiving the plans for the $15,000 home from Franklin T. Griffith, president N.E.L.A.

Western Students Win First and Second Prizes

Miss Julia S. Groo and Guadencia Pinaroc Win Electric Home and Scholarship in Home Lighting Contest

The international grand prize and one of the two second awards in the Better Lighting Contest, conducted by the Lighting Educational Committee of the N.E.L.A., were won by two Pacific Coast high school students. The $15,000 electric home, which was given as the grand prize, was won by Miss Julia Sutherland Groo of Portland, Ore., and Guadencia Pinaroc of Oakland, Calif., was awarded a $1,200 scholarship in any college or university in the United States or Canada. Miss Groo had been the winner of the $200 prize in the Portland district, and Mr. Pinaroc received awards amounting to $550 from his local and regional districts.

Miss Groo, an 18-year-old senior in the Lincoln High School of Portland, has announced that she will build the model electric home in Portland on a site not yet selected. Mr. Pinaroc, a 16-year-old Filipino who has been in the United States only three years, is a freshman in high school and intends to complete his high school education with the aid of the cash secured from his local district, and will use the $1,200 scholarship to assist him in his university career.

Presentation of the certificate for the first prize, and of the plans and specifications of the home, was made to Miss Groo by Franklin T. Griffith, president of the Portland Electric Power Company, and also president of the National Electric Light Association, in a simple ceremony conducted at the Lincoln High School, Jan. 6, 1925. Edgar B. Piper, editor of the Portland Oregonian, and George L. Baker, mayor of the city, took part in the ceremony complimenting the winner. Miss Groo, whose charming personality was felt by all present, responded in a brief speech, modestly accepting the award.

A. C. McMicken, sales manager of the Portland Electric Power Company, and regional director of the Better Home Lighting Contest for the Northwest, and F. H. Murphy, illuminating engineer of the same company, and chairman of the Portland Home Lighting Committee, assisted in the arrangements for the ceremony, at which the committee members and judges in the local contest were present on the stage.

Beside the award of the grand prize, Miss Groo was presented with an order for a $500 garage by the Aladdin Company, to be erected at the site of her new home. She was also offered a position with the Edison Lamp Works of the General Electric Company, at Harrison, N. J., as soon as she should finish her college course which will follow her graduation from high school this year. This position is to be that of lighting expert specializing in home lighting.

GUADENCIA PINAROC

Miss Groo is the daughter of Jay S. Groo, who was for some time sales manager of the Northwestern Electric Company, Portland.

Presentation of the second international prize was made to Mr. Pinaroc at a meeting of the Oakland Electric Club on Jan. 12.

Explosion at Long Beach Plant Kills Four Workmen

Serious accident to a 1,500-hp. steam boiler in the new 100,000-hp. Long Beach steam plant of the Southern California Edison Company, Los Angeles, Calif., due to explosion of accumulation of fuel gas in the furnace, resulted in the loss of four workmen's lives and injury to fifteen.

The boiler was not yet in service but was being warmed up by about one-sixth of the fuel necessary for a full load. For some reason the fires were turned out without proper closing of valves, and an attempt made to relight the fires caused ignition of the explosive mixture. The steam pressure in the boiler at the time was 250 lbs.

With the exception of a few tubes, which will have to be re-rolled, no damage resulted to the boiler proper. The brick work on the boiler setting must be rebuilt, and about half of the windows in the boiler room were blown out or damaged. No damage was sustained by the steel supporting structure of the boiler proper, and practically no damage was done to other boilers in the plant or to the building or apparatus. The damage to the boiler setting and building is estimated at about $20,000. The plant was back in service about five hours after the explosion occurred.

The number of casualties was due to the fact that a large crew of construction men was working in the vicinity of the boiler, and the personal injuries were caused by the force of the explosion and falling material. There was no escaping steam or damage from burns or fire.

Reduction in Prices Announced on All Mazda Brand Lamps

Effective Jan. 1, a reduction was made in the prices of the larger sizes of Mazda lamps. The reduction is of particular interest to users of lamps of 100 to 1,000 watts, on which it amounts to approximately 10 per cent. As the trend of modern commercial lighting has been toward the larger and more efficient type of lamp, factories, industrial shops, stores, office buildings and theaters will be largely benefited by the decreased costs.

The new price lists for Mazda C lamps are as follows:

	Clear	Bowl Enamel	Daylight
100 watt	$ .50	$ .55	$ .80
150 watt	.65	.70	1.05
200 watt	.80	.85	1.30
300 watt	1.25	1.35	1.85
500 watt	2.00	2.15	2.85
750 watt	3.50	3.70	
1,000 watt	3.75	3.95	

This cut in the cost of lamps is attributed to improved machinery and processes which have resulted in greater manufacturing economies.

Long-Bell Electrification Is Described Before Engineers.—At the December meeting of the A.I.E.E., Seattle section, L. D. Beach, electrical engineer, Long-Bell Lumber Company, Longview, Wash., was the principal speaker. He discussed "Electrical Features of the Long-Bell Lumber Company's Development." Mr. Beach had charge of this work for the company's new mill and town development at Longview, Wash.

Pacific Coast Electrical Association

Technical Section Conclave Held at San Francisco

Active Interest in Work at Hand and Projected Evidenced by 145 Men Attending the Various Sessions

Successful and satisfying are the two words best describing the recent conclave of the Technical Section of the Pacific Coast Electrical Association. The Fairmont Hotel was the rendezvous and was entirely satisfactory as such. The meetings were successful in the amount of work upon which progress was reported, the amount of work completed and nearly completed, and in the active interest shown by the 145 men in attendance at the various meetings. Satisfaction was obvious from the remarks of the delegates and visitors.

The meetings were called to order promptly at ten o'clock the morning of Jan. 7 as scheduled and proceeded at once to the work in hand. The discussion was lively and entered into by many different men and became at times just a little bit warm. This demonstrated the interest in and the attention paid to what was going on at the sessions.

Diversion from strictly technical affairs was afforded at two successful social meetings. Thursday evening delegates and visitors gathered in the Red Room and were treated to four interesting and enlightening discussions by as any speakers. S. Waldo Coleman, president of the Coast Counties Gas & Electric Company, spoke on the relation of the technical to the financial side of the business. J. D. McKee, president of the California Oregon Power Company, gave some interesting information about public utility financing and the value of the engineer from the financial viewpoint. S. J. Lisberger advised his listeners that the engineer must be a salesman; that he should have enthusiasm in his work; and that he should train the younger men under him. C. T. Hutchinson, editorial director of the Journal of Electricity, presented some interesting figures comparing the electrical development in the West for 1923 and 1924 and the program for 1925 as announced by the utilities companies.

Friday noon, after most of the work had been completed, everybody gathered again in the Red Room for an informal luncheon and to hear from the Coast's delegates to the St. Louis conclave last October. Also each bureau chairman gave a brief resume of the work of his bureau in order that each person might have a general idea of what was going on even though he had been able to attend only a few of the meetings.

The program of the overhead systems bureau was perhaps the heaviest and lasted the full three days. The first day was given over to reports and discussions of a general nature covering the activities of the committees on distribution transformer standardization, line construction costs, poles, testing high voltage insulators in service, and transmission at 220 kv. Thursday and Friday were used in full by the committee on line construction rules with its various subcommittees.

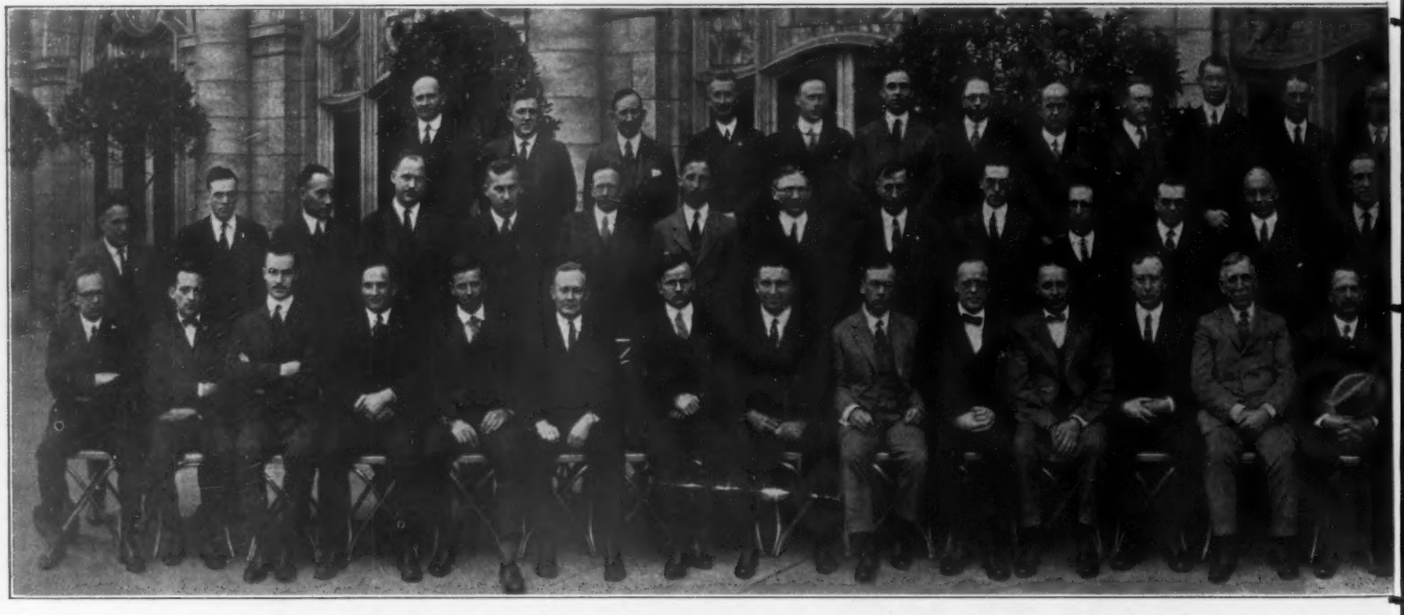
Not to be outdone by the rules committee, the apparatus bureau added a day to its schedule, finding that more work was at hand than could be completed in one day.

A concentrated half-day session completed the work of the bureau on safety rules while those on prime movers, underground systems, hydraulic power, meters, and inductive co-ordination were busy throughout their full allotment of time.

The accident prevention bureau put in two busy days even though but two of the regular members of the bureau were present and the attendance never exceeded five at any one session. The accident prevention program was thorough, efficient and destined to be of value to the companies actively supporting this phase of the work.

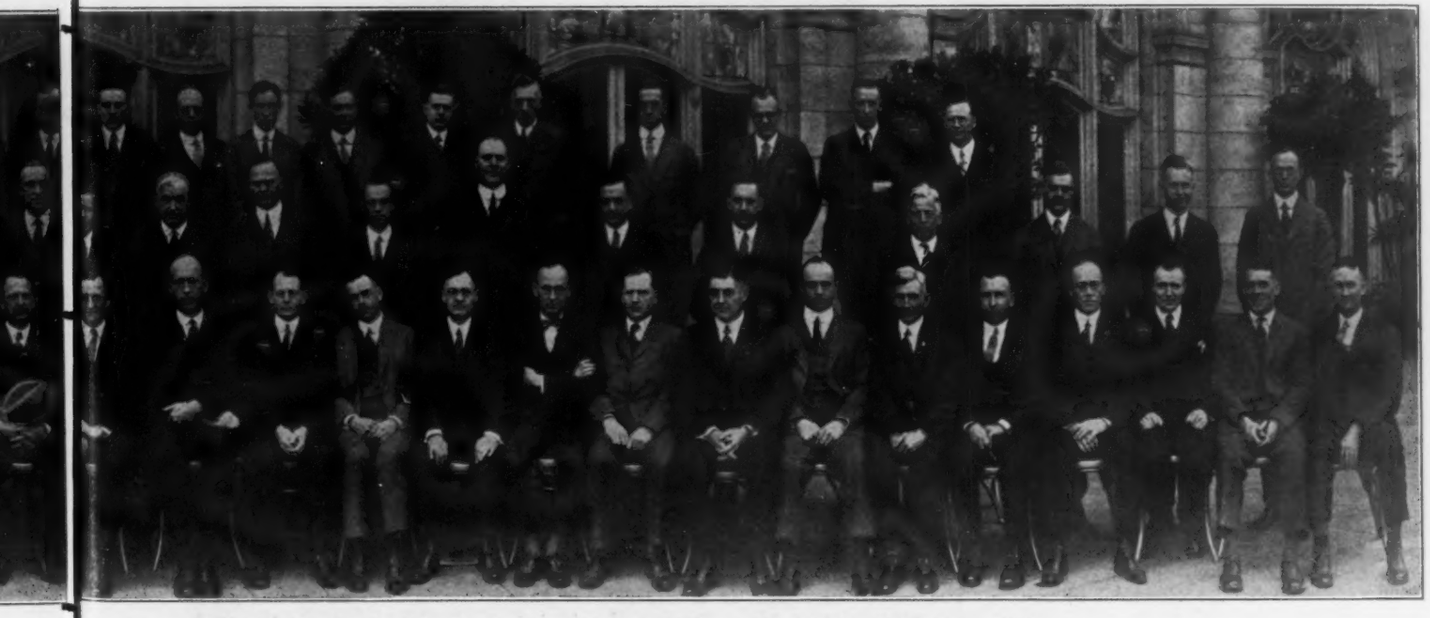
Intensive work is planned by all divisions for the next quarter in order that matters may be brought to a close at the Fresno conclave of the section in March. After that time everybody will be more than busy rounding into final shape and placing in working order the plans and activities for the annual convention of the National Electric Light Association to be held in San Francisco in June. A complete list of those attending the various sessions is as follows:

Abel, J. C.—Western States Gas & Electric Company, Stockton.
Adams, Julian—Pacific Electric Railway Company, Los Angeles.
Affolter, P. H.—Garland-Affolter Engineering Company, San Francisco.
Ager, R. W.—Southern California Edison Company, Los Angeles.
Albert, J. C.—Bureau of Power & Light, Los Angeles.
Andrews, C. A.—Westinghouse Electric & Manufacturing Company, San Francisco.
Baker, W. R.—Pacific Gas and Electric Company, San Francisco.
Bell, H. P.—Key System Transit Company, San Francisco.
Benham, C. F.—Great Western Power Company, San Francisco.
Benson, F. H.—Pacific Gas and Electric Company, San Francisco.
Blecksmith, A. F.—Duncan Electric Manufacturing Company.
Bolser, M. O.—Bureau of Power & Light, Los Angeles.
Bowers, N. A.—Engineering News-Record, San Francisco.



Showing part of the delegates and visitors in attendance at the meetings of the Technical Section of the Pacific

Boyles, R. G.—Southern California Edison Company, Los Angeles.
Brandt, A. U.—Pacific Gas and Electric Company, San Francisco.
Bridges, J. E.—Westinghouse Electric & Manufacturing Company, San Francisco.
Briggs, J. H.—Pacific Gas and Electric Company, San Francisco.
Buehle, E. L.—Pelton Water Wheel Company, San Francisco.
Buell, H. H.—Pacific Gas and Electric Company, San Francisco.
Bullis, S. M.—California Oregon Power Company, Medford, Ore.
Buswell, J. M.—San Joaquin Light & Power Corporation, Fresno.
Capek, T. S.—Pacific Gas and Electric Company, San Francisco.
Cates, R. H.—Southern California Edison Company, Los Angeles.
Champreaux, E. G.—Pacific Telephone & Telegraph Company, San Francisco.
Champion, E. L.—Municipal Lighting Department, Pasadena.
Cobb, R. M.—Pacific Electric Railway Company, Los Angeles.
Coghlan, S. F.—Southern California Edison Company, Los Angeles.
Coleman, S. W.—Coast Counties Gas & Electric Company, Santa Cruz.
Cone, D. I.—Pacific Telephone & Telegraph Company, San Francisco.
Conrad, L. L.—Southern California Edison Company, Alhambra.
Cook, R. E.—Pacific Gas and Electric Company, San Francisco.
Copley, A. W.—Westinghouse Electric & Manufacturing Company, San Francisco.
Corbett, L. J.—Pacific Gas and Electric Company, San Francisco.
Cox, H. H.—Bureau of Power & Light, Los Angeles.
Crellin, A. E.—Pacific Gas and Electric Company, San Francisco.
Crilly, J. E.—Western Electric Company, San Francisco.
Crowell, R.—Pacific Gas and Electric Company, San Francisco.
Cunningham, J. H.—General Electric Company, Los Angeles.
Delany, C. H.—Pacific Gas and Electric Company, San Francisco.
DeWitt, C.—Pacific Gas and Electric Company, San Francisco.
Dreyer, Walter—Pacific Gas and Electric Company, San Francisco.
Duesbury, A. L.—Western States Gas & Electric Company, Stockton.
Ellis, F. T.—Pacific Gas and Electric Company, San Francisco.
Estcourt, V. F.—Pacific Gas and Electric Company, San Francisco.
Eveling, G. H.—Pacific Gas and Electric Company, San Francisco.
Fields, B. W.—Postal Telegraph Cable Company, San Francisco.
Findley, R. B.—General Electric Company, San Francisco.
Fisher, E. C.—Joint Pole Association, San Francisco.
Foster, W. J.—Western Electro-Mechanical Company, Oakland.
Fuller, W. J.—Bureau of Power & Light, Los Angeles.
Garman, E. B.—Bureau of Power & Light, Los Angeles.
Gaylord, J. C.—Southern California Edison Company, Los Angeles.
Gilcrist, C. F.—San Joaquin Light & Power Corporation, Fresno.
Hall, A. J.—Ontario Power Company, Ontario.
Harmon, C. R.—Manufacturer's representative.
Heckman, G. C.—Southern California Edison Company, Big Creek.
Henninger, G. R.—Journal of Electricity, San Francisco.
Heston, W. C.—Electrical World, San Francisco.
Hill, G. S.—Pacific Gas and Electric Company, San Francisco.
Hinson, N. B.—Southern California Edison Company, Los Angeles.
Holst, B. C.—W. N. Matthews Corporation, San Francisco.
Hopkins, R. A.—Westinghouse Electric & Manufacturing Company, Los Angeles.
Hutchinson, C. T.—Journal of Electricity, San Francisco.
Hutchinson, E. C.—Pelton Water Wheel Company, San Francisco.
Ingalls, C. E.—C. E. Ingalls, Inc., San Francisco.
Irwin, Ernest—California Independent Telephone Association, Pomona.
Kasdorff, W. A.—Western Union Telegraph Company, San Francisco.
Keesling, H. G.—Pacific Gas and Electric Company, Oakland.
Kellogg, R. B.—Southern California Edison Company, Los Angeles.
Kellogg, R. B.—Pacific Gas and Electric Company, San Francisco.
Kennelly, D. J.—Southern California Edison Company, Los Angeles.
Kephart, S. W.—Pacific Telephone & Telegraph Company, San Francisco.
Kimball, G. E.—Industrial Accident Commission, San Francisco.
Kirtley, C. J.—Pacific Gas and Electric Company, Oakland.
Klauber, L. M.—San Diego Consolidated Gas & Electric Company, San Diego.
Knopp, O. A.—Pacific Gas and Electric Company, San Francisco.
Lacy, R. W.—Santa Monica Bay Telephone Company, Santa Monica.
Laidlaw, H. A.—Pacific Gas and Electric Company, San Francisco.
Lawton, R. B.—Southern California Edison Company, Big Creek.
Leach, F. A., Jr.—Pacific Gas and Electric Company, San Francisco.
Lutge, H. V.—Pacific Gas and Electric Company, San Francisco.
L'Hommedieu, W. P.—Westinghouse Electric & Manufacturing Company, San Francisco.
Lebenbaum, Paul—Southern Pacific Company, San Francisco.
Lindblad, W. N.—Pacific Gas and Electric Company, San Francisco.
Lisberger, S. J.—Pacific Gas and Electric Company, San Francisco.
Mahon, R. L.—Pelton Water Wheel Company, San Francisco.
May, C. C.—San Diego Consolidated Gas & Electric Company, San Diego.
Mayer, F. H.—Southern California Edison Company, Los Angeles.
McKee, J. D.—California Oregon Power Company, Medford, Ore.
Michener, H.—Southern California Edison Company, Los Angeles.
Minor, H. H.—San Joaquin Light & Power Corporation, Fresno.
Moan, A. J.—The Johns-Pratt Company, San Francisco.
Monges, R. F.—General Electric Company, San Francisco.
Moore, R. D.—Southern Pacific Company.
Morris, J. M.—Westinghouse Electric & Manufacturing Company, Los Angeles.
Myers, A. J.—City of San Francisco, San Francisco.
MacDonald, G. A.—Bureau of Power & Light, Los Angeles.
McCandless, W. A.—Southern California Telephone Company, Los Angeles.
McDonald, J. E.—Joint Pole Committee, Los Angeles.
Neill, H. F.—San Francisco & Sacramento Railroad.
Northmore, E. R.—Los Angeles Gas & Electric Corporation, Los Angeles.
Nott, L. A.—Sangamo Electric Company, San Francisco.
Nott, G. E.—Southern California Telephone Company, Los Angeles.
Ost, P. J.—City of San Francisco, San Francisco.
Owen, F. B.—Pacific Telephone & Telegraph Company.
Owen, L. G.—Pacific Gas and Electric Company, San Mateo.
Peabody, R. M.—Southern California Edison Company, Los Angeles.
Perrin, L. M.—City of San Francisco, San Francisco.
Porter, E. Y.—Southern Sierras Power Company, Riverside.
Powell, R. C.—Pacific Gas and Electric Company, San Francisco.
Pride, A. W.—Westinghouse Electric & Manufacturing Company, Emeryville.
Quick, R. S.—Pelton Water Wheel Company, San Francisco.
Robertson, R. R.—Bureau of Power & Light, Los Angeles.
Robinson, D. M.—Pacific Gas and Electric Company.
Russell, S. P.—H. B. Squires Company, San Francisco.
Schnapp, M. H.—General Electric Company, San Francisco.
Schoch, A. J.—San Diego Consolidated Gas & Electric Company, San Diego.
Schoenberger, E. B.—Pacific Gas and Electric Company, San Jose.
Schnell, C. E.—San Joaquin Light & Power Corporation, Fresno.



of the ific Coast Electrical Association held Jan. 7, 8 and 9 at the Fairmont Hotel, San Francisco, Calif.

PRINT IN BINDING

Searle, G. H.—Pacific Gas and Electric Company, San Francisco.
Sharp, H. G.—Pacific Coast Steel Company, San Francisco.
Smith, Vinton—Standard Underground Cable Company, Oakland.
Smith, W. C.—General Electric Company, San Francisco.
Snell, T. W.—Coast Valley Gas & Electric Company, Salinas.
Stanley, H. E.—General Electric Company, San Francisco.
Steele, E. H.—Pacific Gas and Electric Company, San Francisco.
Steinbeck, C. E.—Pacific Gas and Electric Company, San Francisco.
Stewart, C. R.—Southern California Edison Company, Los Angeles.
Stewart, F. E.—Pacific Telephone & Telegraph Company, San Francisco.
Stott, J. H.—Pacific Gas and Electric Company, San Francisco.
Sutcliffe, H. F.—Pacific Gas and Electric Company, San Francisco.
Talbott, W. H.—San Diego Consolidated Gas & Electric Company, San Diego.
Thompson, J. S.—Pacific Electric Manufacturing Company, San Francisco.
Van Bokkelen, W. R.—Coast Counties Gas & Electric Company, Santa Cruz.
Wagner, Charles—Market Street Railway Company, San Francisco.
Walker, C. W.—Ontario Power Company, Ontario.
Waltham, R. O.—California Railroad Commission, San Francisco.
Weymouth, C. H.—Charles C. Moore Company, Engineers, Inc., San Francisco.
Whitney, W. G.—Pacific Gas and Electric Company, San Francisco.
Wiggins, C. W.—San Diego Consolidated Gas & Electric Company, San Diego.
Wilkie, F. H.—Pacific Gas and Electric Company, Oakland.
Wilkins, Roy—Pacific Gas and Electric Company, San Francisco.
Wingard, O. W.—Bureau of Power & Light, Los Angeles.
Winter, W. L.—Westinghouse Electric & Manufacturing Company, San Francisco.
Woodbridge, J. E.—Ford, Bacon & Davis, Inc., San Francisco.
Wright, E. M.—Pacific Gas and Electric Company, San Francisco.
Yeager, L. B.—Los Angeles Railway Corporation, Los Angeles.
Young, C. E.—Pacific Gas and Electric Company, San Francisco.

Commercial Section Executive Committee Meeting Report

The executive committee of the Commercial Section of the Pacific Coast Electrical Association met at the Palace Hotel, San Francisco, Calif., Jan. 9 at 10 a.m. A. M. Frost, manager of sales, San Joaquin Light & Power Corporation, Fresno, Calif., and chairman of the committee, presided, while J. L. Moulton officiated as secretary pro tem. The meeting was largely taken up with reports of the various committee chairmen and with discussions of papers for the annual convention to be held at San Francisco the week of June 15, 1925.

Mr. Moulton as chairman of the electric transportation bureau presented a report for that bureau, and the report of the appliance bureau was presented by the chairman, H. C. Goldrick, specialty sales manager, Western Electric Company, Los Angeles, Calif. H. K. Griffin of the Western States Gas & Electric Company, Stockton, Calif., reported on the customer relations bureau and described briefly an employees' manual that is being drawn up by the bureau. A report of the Lighting Bureau was presented by the chairman, H. M. Crawford, sales manager, Pacific Gas and Electric Company, San Francisco, who told of the various activities of the lighting bureau. V. W. Hartley reported on the Home Lighting Contest and the follow-up that has been made effective by the electrical industry. Clark Baker of National Lamp Works of General Electric Company, Oakland, Calif., described the lighting school that is to be held in Los Angeles, beginning Jan. 19, and in San Francisco, beginning Feb. 2, and gave considerable detail of the course to be presented, as well as the personnel of the faculty. Roy C. Bragg, chairman of the electric cooking and heating bureau, reported for that bureau, and H. E. Sandoval, manager electric sales, Pacific Gas and Electric Company, San Francisco, presented the report of the power bureau. E. G. Stahl of the San Joaquin Light & Power Corporation reported for the subcommittee on electricity in agriculture. Roy C. Bragg, H. C. Goldrick and G. W. Barker were appointed by the executive committee to attend the meeting of the Commercial National Section, to be held at New York City March 17-19.

The next meeting of the executive committee of the Commercial Section will be held at Fresno, Calif., April 3 and 4. This will be a conclave and executive meeting and will be held in the San Joaquin Light & Power Corporation's building.

Purchasing and Stores Section to Meet in February.—The Purchasing and Stores Section of the P.C.E.A. will hold a conclave meeting at the San Joaquin Light & Power Building, Fresno, Calif., Feb. 10 and 11.

Publicity Section to Hold Meeting in Fresno.—A. C. Joy, chairman of the Publicity Section of the P.C.E.A., has called a meeting of that section for Jan. 31. The meeting will be held in the committee room of the San Joaquin Light & Power Building, Fresno, Calif., and will convene at 10 a.m. The section will outline papers to be prepared in advance of the coming P.C.E.A. convention.

G. E. Company Disposes of Stock in Electric Bond & Share

The board of directors of the General Electric Company, at a special meeting in New York City on Dec. 30, 1924, took action whereby the company will dispose of its holdings in the Electric Bond & Share Company. The method by which this will be done is explained in the following statement issued to the stockholders of the General Electric Company under date of Dec. 30 and signed by Owen D. Young, chairman of the board of directors, and Gerard Swope, president of the company:

"The General Electric Company, having decided to dispose of all of its shareholdings in the Electric Bond & Share Company, will do so by organizing a new corporation under the laws of the State of New York with an authorized capital stock of 1,802,870 shares without par value (being the same number of shares as the outstanding common stock of the General Electric Company) and by transferring to such new corporation:

"(a) 300 shares of the 6 per cent cumulative preferred stock of the Electric Bond & Share Company, having a par value of $30,000, and

"(b) 250,000 shares of the common stock of the Electric Bond & Share Company (being the entire common stock), having a par value of $25,000,000, and now paying dividends at the rate of 8 per cent per annum.

"The new corporation, in consideration of such transfer, will distribute its shares to the stockholders of record of the General Electric Company as of Jan. 15, 1925, ratably in proportion to their holdings; that is to say, one share of stock of the new corporation to each General Electric share. This distribution will be made on Feb. 1, 1925, or as soon thereafter as the necessary legal steps can be taken, when certificates for shares of the new corporation will be mailed to all stockholders of the General Electric Company.

Municipal Water System Salaries Not Exempt From Tax

A careful study is being made by Senator Shortridge of California of the ruling made by the Commissioner of Internal Revenue, in which he finds, among other things, that compensation received for services for a municipally-owned water system is not exempt from income tax. Senator Shortridge states that he is not as yet prepared to say that the ruling is in any way unjust, but he believes the status of state and municipal employees in the service of publicly owned utilities should be considered very carefully before this ruling is accepted. The commissioner's finding in this connection was handed down Sept. 1, 1924. It follows:

In deciding whether or not any particular activity in which a state or municipality may be engaged is a governmental function, the attitude of the federal rather than the state authorities should govern.

The compensation received for services rendered in connection with a municipally owned water system is not exempt from income tax.

Advice is requested relative to the application of the principles set forth in Solicitor's Opinion 152 (C.B. II-2, 93), where it was held that the compensation of employees of a street railway owned and operated by a municipality was not exempt from federal income tax under the Revenue Act of 1921, upon the theory that the operation of a street railway is not a governmental function of a city.

In deciding whether or not any particular activity in which a state or municipality may be engaged is a governmental function, the attitude of the federal rather than the state authorities should govern. [See St. Louis Cotton Compress Co. v. Arkansas, 260 U. S. 346; Boston & Maine Railroad v. United States, 265 Fed. 578 (T. D. 3004); Lane Timber Co. v. Hynson, T. D. 3592; Bulletin III-22, 22; Boise Title & Trust Co. v. Evans, 295 Fed. 223 (T. D. 3551; Bulletin III-8, 10).] Where there is a substantial difference of opinion among the state courts and no ruling of any federal court, the decisions of those courts holding a certain activity to be non-governmental should be followed in every state, regardless of the rulings of individual states to the contrary. The existence of a well-founded or rational doubt as to the character of the activity should be considered as equivalent to the denial of a claim for exemption on behalf of an employee. In general, the rule that exemptions from taxation are to be strictly construed should be applied and no intendment should be taken in favor of the taxpayer in doubtful cases. (See Wright v. Georgia, etc., R. R. Co., 216 U. S. 420.)

In the brief filed on behalf of the employees of the municipally owned waterworks system, decisions of the courts of the state holding that the operation of a waterworks system of a city is an exercise of a governmental function are cited. The United States District Court for the District of Massachusetts on May 21, 1924, however, decided that compensation received for services rendered in connection with a municipally owned water system was not exempt from income tax. (Metcalfe v. Eddy, unreported to date.) This appears to be in harmony with the rulings of the federal courts holding municipal waterworks to be non-governmental in cases other than those involving income taxes (Winona v. Botzet, 169 Fed. 321), as well as with the weight of authority among the states, and should be followed in all cases, irrespective of the attitude of the courts or statutes of the individual states.

Inquiry is also made as to whether or not the ruling set forth in Solicitor's Opinion 152 should be made retroactive under the Revenue Act of 1921. In the opinion of this office that ruling necessarily controls all cases arising under the Act referred to.

Meetings

Essay Contest Is Discussed at Association Meetings

Talks by two high school students, Arthur Wuth and Russell Dondanville, both of Denver, Colo., were the outstanding features of the annual joint midwinter meeting of the Rocky Mountain Division of the National Electric Light Association and the Colorado Public Service Association, held in Denver Dec. 18. The boys, both speakers of unusual ability, were assigned the responsibility of determining, by personal contact, the effect upon students of the recent Better Home Lighting Essay contest. They gave the results of their investigation to the utility men in ten-minute speeches. Both boys have won awards for public speaking, and the capable manner in which they covered their subjects made a deep impression upon the utility representatives.

C. N. Stannard, vice-president and general manager of the Public Service Company of Colorado, regional director of the essay contest activities, and S. W. Bishop, manager of the Electrical Cooperative League of Denver, under whose auspices the Denver contest was held, also reported. In the opinion of these two speakers, the contest was a tremendous success.

J. J. Withrow of the Sheridan Electric Company, Sheridan, Wyo., led the discussion on the essay contest. He conducted the most successful contest recorded in the Rocky Mountain territory. Out of 800 students who enrolled in the contest he was able to obtain return of 735 completed essays.

In the opinion of the delegates to the Denver conference, the contest should be held annually, for the interest that was aroused among adults as well as the school children indicates that the entire utility industry has greatly benefited, especially from the standpoint of public relations.

Approximately 120 electric, gas, street railway and telephone company representatives attended the Denver meeting. One session was presided over by W. P. Southard, president of the Colorado association. C. A. Semrad, president of the Rocky Mountain Division of the N.E.L.A., presided at the other.

RUSSELL DONDANVILLE.

Discussion covered a wide range of subjects, including natural gas; traffic problems as they relate to the public utility industry as a whole; cooperation of the utilities and the institutions of higher education; merchandising; the work of women's public relations committees; rural extension problems and kindred topics.

COMING EVENTS

Electrical Contractors and Dealers' Association of San Francisco—
Annual Banquet—Whitcomb Hotel, San Francisco, Calif.
Jan. 17, 1925

Pacific Division Electrical Supply Jobbers' Association—
Annual Meeting—Del Monte, Calif.
Jan. 29-31, 1925

California Electragists—
Quarterly Meeting—Sacramento, Calif.
Feb. 13-14, 1925

New Mexico Electrical Association—
Annual Convention—Albuquerque, N. M.
Feb. 16-18, 1925

Commercial National Section, N.E.L.A.—
New York, N. Y.
March 17-19, 1925

Southwestern Public Service Association—
Annual Convention—Rice Hotel, Houston, Texas
May 5-8, 1925

Electrical Supply Jobbers' Association—
Annual Convention—Hot Springs, Va.
June 1-6, 1925

National Electric Light Association—
Annual Convention—San Francisco, Calif.
June 15-19, 1925

Pacific Coast Jobbers to Meet at Del Monte.—The annual meeting of the Pacific Division of the Electrical Supply Jobbers' Association will be held at the Hotel Del Monte, Del Monte, Calif., Jan. 29-31. Officers for the coming year will be elected at this meeting, which is the first one to be held in 1925.

Washington Water Power Commercial Department Holds Banquet.—The commercial department of The Washington Water Power Company, Spokane, Wash., held its annual banquet at the Davenport Hotel on the evening of Dec. 30. Lewis A. Lewis, sales manager, presided and complimented the department upon the excellent results shown during 1924 in Spokane, where the sales of merchandise showed an increase over the previous year. Most of the local retailers have reported a decrease in volume for 1924 as compared with 1923. Entertainment was provided by various members of the department.

Construction of Pit 4 Plant to Be Started in 1925.—The Pacific Gas and Electric Company, San Francisco, Calif., has announced that construction work on the Pit 4 generating plant of the company on Pit River in northern California will be started in 1925. This plant, according to early estimates, will have a capacity of 135,000 hp. when completed and will cost in the neighborhood of $15,000,000. It is planned to spend approximately one-sixth of this amount for work to be done during the present year. Details of design and construction have not been announced by the company.

San Diego Club Elects Officers at Annual Meeting

Hugo Kuehmsted and Herb Rose were named as the friendly rivals for the presidency of the Electric Club of San Diego, Calif., by the nominating committee, as reported to the club at its Jan. 6 meeting. The election of officers was held at the annual meeting and banquet Jan. 13 at the Cabrillo Cafe, the former power company office building now turned restaurant.

For first vice-president, Bruno Barth and H. H. Watson were put up for choice, while C. C. Clardy and William Ellison vied for the second vice-presidency. The secretary-treasurership was left to the club for decision between the incumbent, Guy Miller, and Charles Stevens.

As candidates for the executive committee of five the following were named by the nominating committee: William Boyce, W. A. Cyr, G. H. P. Dellmann, Al May, Carl Wiggins, E. R. Damarus, Ralph Zink, Sam Hall, Evan Shaeffer and Walter Rainey.

The nominating committee this year as appointed by G. H. P. Dellmann, retiring president, was composed of Walter Wurfel, chairman; Jess Zwiener, Al May, Bruno Barth and C. L. Lawrie.

COMING PACIFIC COAST ELECTRICAL ASSOCIATION MEETINGS

Publicity Section—
San Joaquin Light & Power Building, Fresno, Calif.
Jan. 31, 1925.

Purchasing and Stores Section—
San Joaquin Light & Power Building, Fresno, Calif.
Feb. 10-11, 1925

Technical Section—
Conclave and Executive Meeting—San Joaquin Light & Power Building, Fresno, Calif.
March 25-27, 1925

Commercial Section—
Conclave and Executive Meeting—San Joaquin Light & Power Building, Fresno, Calif.
April 3-4, 1925

California Electragists to Hold Quarterly Meeting

The California Electragists will hold their regular quarterly meeting at Sacramento, Calif., Feb. 14, 1925. Walter F. Price, executive secretary, has made arrangements with the Southern Pacific Company for the use of the steamer Navajo for those members from the San Francisco Bay territory and others who wish to make the trip to Sacramento by boat. The Navajo will leave San Francisco at 5:30 p.m. Friday, Feb. 13, and will arrive in Sacramento early the following morning. The executive committee meeting will be held at 9 a.m. Saturday, Feb. 14, and there will be an open meeting at 1 o'clock on the same date. The boat party will leave Sacramento on the return trip at 6 p.m., Feb. 14, and will arrive in San Francisco about 9 a. m. the following day.

The round trip fare, including dinner, midnight lunch and breakfast on the boat each way, is $12. Reservations should be made immediately. Tickets may be secured only from Walter F. Price, executive secretary, California Electragists, 318 New Call Building, San Francisco.

Personals

Curtis B. Hawley, vice-president and general manager of the Inter-Mountain Electric Company, Salt Lake City, Utah, was recently elected president of the Rocky Mountain Electrical Cooperative League and chairman of the board of trustees of that organization. Mr. Hawley is one of the most prominent and active men of the electrical industry in the Intermountain section. He

CURTIS B. HAWLEY.

was born in Salt Lake City in 1872. In 1888 he finished his high school work and entered the Rio Grande Railroad shops in Salt Lake City as a mechanic. In his spare time he studied electrical engineering, and a short time later he obtained a position as engineer in one of the first lighting plants established in Salt Lake City. After a short time he left to accept the position of master mechanic with the street railway company of that city, remaining there three years. After a short absence from Salt Lake, he returned and entered the electrical contracting business, organizing the Utah Electrical Company, a small corporation with a capital of $5,000. The business grew, and in 1906 Mr. Hawley, together with Lafayette Hanchett, who is now president of the Utah Power & Light Company, and two other associates, bought the Inter-Mountain Electric Company. Under Mr. Hawley's management the business has expanded greatly. In addition to his active participation in league affairs and in matters pertaining to the upbuilding of the electrical industry in his territory, Mr. Hawley gives generously of his time and his ability in furthering the civic interests of his city and the general welfare of the State of Utah. In 1920 and 1921 he served as president of the Salt Lake City Chamber of Commerce, and has been instrumental in the success of a number of community enterprises.

J. W. Bridger, salesman for the Westinghouse Electric & Manufacturing Company, recently returned to his position in Denver, Colo., after a seven months' leave of absence.

D. C. Barnes, formerly manager of the central district, Puget Sound Power & Light Company, Seattle, Wash., and now vice-president of the company with headquarters in Boston, Mass., recently spent two weeks in Seattle. He expects to visit the Coast at least once a year.

Arthur Kempston, formerly with Chas. T. Phillips & Company, consulting engineers of Los Angeles, Calif., has been made assistant manager of the Majestic Electric Appliance Company, San Francisco, Calif.

J. H. Cunningham, General Electric Company, Los Angeles, Calif., recently spent some time in San Francisco while in attendance at the session of the P.C.E.A. Technical Section meeting.

R. G. Boyles, superintendent of distribution, Southern California Edison Company, Los Angeles, Calif., was an attendant at the recent meeting of the P.C.E.A. Technical Section held in San Francisco, Calif., recently.

Frank A. Ketchem, general manager of the merchandising department of the Western Electric Company, New York City, is visiting on the Pacific Coast. Mr. Ketchem will take in all of the Coast offices of the company before returning to his office.

I. U. Muffley, resident manager of the Puget Sound Power & Light Company at Wenatchee, Wash., was chairman of the committee in charge of street decorations in that city during the recent holiday season.

W. F. Hynes, electrical engineer of Portland, Ore., was a recent visitor in San Francisco, Calif.

Murray Bourne, San Joaquin Light & Power Company, Fresno, Calif., recently paid a visit to San Francisco, Calif.

H. L. Rubardt, Los Angeles, Calif., has purchased Quick's Electric Shop, 4505 South Vermont Avenue, that city. Using the same firm name, he will manufacture and stock radio equipment, in addition to retailing electrical equipment and contracting.

William Hoflich, formerly associated with Glenn W. Willard in the Albany Electric Store, Albany, Ore., recently became local agent for Delco farm lighting units, Frigidaire refrigerators and Savage washing machines. He will have headquarters in the Willard Elec-

R. B. Kellogg, superintendent of steam generation for the Southern California Edison Company, Los Angeles, Calif., was an attendant at the Pacific Coast Electrical Association's Technical Section meeting held Jan. 7-9 in San Francisco, Calif.

S. Arnold King, for many years in the service of the Pacific Power & Light Company, Portland, Ore., in various capacities, and more recently lineman and trouble man at Hood River, Ore., has been promoted to be line foreman at Astoria, Ore.

Guy W. Talbot, president, Pacific Power & Light Company, Portland, Ore., recently visited San Francisco, Calif., for the purpose of a business conference. **W. T. Neill,** superintendent of rates and service for the same company, accompanied him.

R. C. W. Libbey, representative of Landers, Frary & Clark, New Britain, Conn., in the Intermountain territory, is attending a sales conference at the factory. While East Mr. Libby expects to visit his old home in Boston, Mass.

C. E. Schnell, electrical designing engineer, San Joaquin Light & Power Corporation, Fresno, Calif., attended the recent meeting of the Technical Section of the Pacific Coast Electrical Association held in San Francisco.

George R. Randall, president and general manager of the Salt Lake Electric Supply Company, Salt Lake City, Utah, was recently elected vice-president of the Rocky Mountain Electrical Cooperative League.

G. C. Heckman, superintendent of electrical construction on the Big Creek project of the Southern California Edison Company, Los Angeles, Calif., attended the meeting of the Technical Section of the Pacific Coast Electrical Association held recently in San Francisco, Calif.

Glenn W. Willard, formerly associated with William Holflich in the Albany Electric Store, Albany, Ore., has purchased the latter's interest. The new establishment will be known as the Willard Electric Store and will engage in a general contractor-dealer business.

R. C. Moeller, general manager of the Providence Insulated Wire Company, Providence, R. I., has just made a trip to Pacific Coast points.

H. L. Melvin, electrical engineer with the Washington Water Power Company, Spokane, Wash., since August, 1922, has resigned to take a position in the engineering department of the Electric Bond & Share Company, New York. In his new position, which he enters upon Jan. 15, he will specialize in power transmission. Mr. Melvin graduated with a B. S. degree from Washington State College, Pullman, in 1911. After graduation he spent a year in the testing department of the General Electric Company, Schenectady, N. Y., and in 1912 returned to Washington State College as instructor in electrical engineering, remaining until 1916. In 1917 he completed a year's study in the Massachusetts Institute of Technology, receiving a master's degree in electrical

H. L. MELVIN.

engineering, and immediately thereafter took a position in the engineering department of the Utah Power & Light Company, Salt Lake City, Utah. He went to the Washington Water Power Company in April, 1920, and was made electrical engineer two years later. Mr. Melvin is past chairman of the Spokane section of the American Institute of Electrical Engineers.

Bernhard Badrian, since 1917 district manager of the Hurley Machine Company, with headquarters at San Francisco, Calif., has resigned from the employ of that company to engage in business for himself as a manufacturers' representative. Mr. Badrian has opened offices in the Rialto Building, San Francisco.

Al and J. E. Podesta, under the firm name of Podesta Bros., have opened a fully equipped electrical shop at 88 Main Street, Jackson, Calif. In addition to handling appliances and general electrical merchandise, the concern does repairing and contracting.

William P. Bear, manager of the Pacific Radio Exposition held in the Civic Auditorium, San Francisco, Calif., 1924, has joined the force of the Magnavox Company, Oakland, Calif.

R. Wolfsberg, until recently manager of the Los Angeles, Calif., office of Allied Industries, Inc., has resigned to go into business for himself.

L. D. Beach, electrical engineer, Long-Bell Lumber Company, Longview, Wash., was the principal speaker at the December meeting of the Seattle section of the A.I.E.E.

A. M. Frost, sales manager, San Joaquin Light & Power Corporation, Fresno, Calif., was a recent visitor in San Francisco, Calif. While there he attended the meeting of the Technical Section of the P.C.E.A.

R. A. Sharon, until recently city sales superintendent, Standard Oil Company, Bakersfield, Calif., has been appointed an assistant sales manager for the Great Western Power Company, San Francisco, Calif. A native of San Francisco, Mr. Sharon attended the Oakland High School and Phillips Exeter Academy, Exeter, N. H., and was graduated from Yale University in 1912, having specialized in electrical engineering. He entered the employ of the City Electric Company, San Francisco, where he was an industrial power salesman until 1918, when he enlisted in the army. While in

R. A. SHARON

service he received a commission as second lieutenant in the Air Service. Upon being discharged from the army he became associated with the Standard Oil Company at Portland, Ore., as salesman. He was promoted to the position of service station superintendent at Seattle, Wash., for that company and later held a similar position at Sacramento, Calif.

R. A. Hopkins and **John Morris,** of the Los Angeles, Calif., office of the Westinghouse Electric & Manufacturing Company, were recent visitors in San Francisco, Calif. While there they attended the Pacific Coast Electrical Association's Technical Section meeting.

J. C. Alberts, superintendent test department, and **H. H. Cox,** superintendent substations, Bureau of Power and Light, Los Angeles, Calif., recently journeyed to San Francisco to be present at the meeting of the P.C.E.A. Technical Section meeting.

K. I. Dazey, San Francisco, Calif., distributor for the Commercial Truck Company, has just returned after a four weeks' trip throughout the East, including an inspection of the factory of the Commercial Truck Company and investigations of operative conditions in the larger Eastern cities.

J. A. Hale, assistant chief engineer, Utah Power & Light Company, Salt Lake City, Utah, is a member of the committee of the Utah section of the American Society of Civil Engineers that is making preliminary plans for the program for the annual convention of the society to be held in Salt Lake City July 8-11, 1925.

H. H. Courtright, manager, Valley Electrical Supply Company, Fresno, Calif., was recently in San Francisco, Calif., on business.

M. E. Wagner, Western Electric Company, New York City, N. Y., recently paid a visit to San Francisco, Calif.

R. B. Lawton, division superintendent of generation in charge of the Big Creek plants of the Southern California Edison Company, Los Angeles, Calif., was among those who attended the meeting of the Technical Section of the Pacific Coast Electrical Association held in San Francisco, Calif., Jan. 7-9.

Roderick McRae, recently line foreman at Astoria, Ore., for the Pacific Power & Light Company, Portland, Ore., has been promoted to be superintendent at Lewiston, Idaho, in charge of the electrical work in that district newly acquired by the Pacific Power & Light Company.

J. A. Kahn, C. B. Hawley, J. M. Perlewitz and **W. J. Berryman,** representing the jobbers; **Robert Miller, W. A. Moser, B. E. Rowley** and **Thad J. Stevens,** representatives of the manufacturers; **J. V. Buckle, George R. Randall, G. W. Forsberg** and **G. J. Guiver** for the contractor-dealers; **D. C. Green, P. M. Parry, H. M. Ferguson** and **R. M. Bleak,** central station delegates; and **Orson John Hyde,** representative of the telephone company, constitute the membership of the recently elected board of trustees of the Rocky Mountain Electrical Cooperative League.

Harold V. Bozell, for the past two and a half years one of the two editors of the Electrical World, has resigned from that position to join the firm of Bonbright & Company, bond brokers, New York City.

C. E. Hardy, chief of the department of electricity, Oakland, Calif., has been appointed a member of the electrical committee of the National Fire Protection Association. **Claude W. Mitchell,** electrical engineer of the Board of Fire Underwriters of the Pacific, San Francisco, is the other member from the Pacific Coast.

Col. H. G. Winsor, recently appointed personnel officer of the Puget Sound Power & Light Company, Seattle, Wash., has come to that company with a long record in public and military service. He is a native of Massachusetts, and beginning in 1893, spent twelve years as electrical inspector in Brockton, Mass. During that time he completed a course in electrical engineering. This was followed by two years in Houghton, Mich., in electrical engineering and construction work, and six years, from 1907 to 1913, with the Minneapolis General Electric Company, as chief inspector. In 1913 he moved to Tacoma, Wash., where for the last twelve years he has held positions with

COL. H. G. WINSOR

the Tacoma Railway & Power Company and the Puget Sound Electric Railway Company, engaged in work concerned with claims and public and industrial relations. He was president of the Tacoma Chamber of Commerce from June, 1923, to December, 1924. His military career includes ten years in the Massachusetts National Guard and eight years, from 1917 to the present date, in the Washington National Guard. In the last named organization he has risen from the grade of captain to that of colonel, the rank he now holds, commanding the 146th Field Artillery. His work in his new position will have to do with all matters pertaining to the personnel of the company's organization. He will cooperate with district managers in all relationships with employees, establishment of company welfare work, mutual benefit associations, group insurance, safety, camps, picnics, athletic teams and similar activities.

E. L. Champion, Municipal Lighting Department, Pasadena, Calif., was present at the session of the Technical Section of the Pacific Coast Electrical Association held recently in San Francisco, Calif.

Obituary

Claire P. Upson, sales manager of the States Company, Hartford, Conn., died on Dec. 6.

TRADE NOTES

The Western Electric Company, Seattle, Wash., recently dedicated its new building to be occupied by the telephone department, bringing together a number of officials of that company and of the Pacific Telephone & Telegraph Company from the entire Pacific Coast. H. B. Treat, division manager telephone department, San Francisco, Calif., acted as host, and after a luncheon at the New Washington Hotel, the guests were conducted through the new three-story building by R. M. Dewart, Seattle. A dance in the building at night concluded the entertainment. Officials of the two companies came from San Francisco, Portland, Spokane and Chicago to attend the dedication.

The Western Cross Arm & Manufacturing Company, Centralia, Wash., has been incorporated for $200,000, with Robert Gillespie, S. R. Bodine and C. D. Cunningham as incorporators.

Mullins Bros., Tacoma, Wash., on a bid of $10,400, received the contract for the electrical installation in the proposed new $255,000 intermediate school to be erected in that city.

W. C. Brown, Seattle, Wash., has opened "Bill's Electrical Shop" in the University district to carry a line of electrical appliances and engage in general electrical repairing. Mrs. Brown will cary a line of novelties in addition.

The Vaughn Electric Company, 2131-3d Avenue, Seattle, Wash., announces that after Jan. 1, it will engage in electrical contracting only and will discontinue its line of electrical appliances and fixtures.

Waffle Irons Featured at Manufacturers' Exposition.—At the Inter-City Manufacturers' Exposition held in Longview and Kelso, Wash., recently, the Puget Sound Power & Light Company had an interesting display. Electrically cooked waffles were served to between 1,000 and 1,500 persons, under the supervision of C. E. Day and E. C. Engfer. The Puget Sound Power & Light Securities Company, which handles the sale of the power company's securities, also had an exhibit, which was in charge of R. L. Southwick.

Radio Industries Corporation, New York, N. Y., has published a booklet which describes in detail the Tropadyne circuit, which is claimed to be an improvement in the super-heterodyne receiver.

W. Wesley Hicks, San Francisco, Calif., has just brought out a new type of electric water heater for use where limited quantities of water are desired and where it is desirable to keep the connected load at a low figure.

A. M. Byers Company, Pittsburgh, Pa., has issued Bulletin No. 26A, "What Is Wrought Iron?", setting forth methods of manufacture, chemical and physical characteristics, and the special advantages of the material for the manufacture of welded pipe. An interesting part of the pamphlet is that devoted to service records from old buildings equipped with Byers pipe.

The R. Thomas & Sons Company, East Liverpool, Ohio, held its annual conference of sales executives at its headquarters in that city during the first week in December. Representatives from the New York, Boston, Pittsburgh, Chicago, Seattle and San Francisco offices, as well as from the export department, were present.

The General Electric Company has issued Bulletin No. 45124, "Street Lighting Transformers." The bulletin is of thirty-two pages and is profusely illustrated. In it are described various types of General Electric constant current transformers, both indoor and outdoor, and for pole or subway mounting, individual lamp series transformers, cutouts, transformer controls and protective devices. A table of transformer capacities is also included.

The genial gentleman presented here is not demonstrating the proper demeanor that should be adopted by a member of the Smiles Club; neither is he testifying to the number of times he has been caught on Tag Day. On the contrary, he is registering pride and pleasure in the fact that his prize chickens won seventeen prizes at the Dinuba Poultry Show last February. The decorations are blue ribbons, and the smiling chicken fancier is H. G. Redfern, manager of the Dinuba district of the San Joaquin Light & Power Corporation, Fresno, Calif. His hobby is raising fancy stock for exhibition purposes, and all his spare time is spent in the 20-ft. electrically-equipped poultry farm in his back yard.

The G. F. Mitchell & Sons Company, Cleveland, Ohio, claims that an entirely new principle of agitation in washing is used in its Washrite machine. This is described in a recently issued publication, copies of which will be mailed free upon application to the company.

Crown Bituminous Corporation, San Francisco, Calif., is introducing to the market "Laykold," an emulsified asphalt with the same uses in the trade as the asphalt now in common use, with the important exception that heat is not required in its application. It is excellent for lining reservoirs and irrigation ditches, according to the manufacturer.

Pass & Seymour, Inc., Solvay, N. Y., is placing on the market a pull socket with several new and striking features. The need of keeping the chain free from live parts is met in a novel way. Inbuilt features back of the bellmouth maintain the safety factor without snubbing attachments on the socket chain. The chain cannot accidentally unhook, and yet may be quickly attached or detached from the new chain hook when desired. The outside appearance of the P. & S. socket has not been changed by these features.

The Commercial Truck Company, which has been engaged in the manufacture of electric trucks for eighteen years, has announced that, in view of the business which has been developed in northern California and the necessity for guaranteeing service to the users of this equipment, it has decided to establish a Pacific Coast factory branch with headquarters in San Francisco, Calif., with K. I. Dazey as manager in charge of both sales and service. The office of the company will be maintained temporarily at 202 Sharon Building, although arrangements are now under way for the establishment of an electric garage and service station.

The P. A. Geier Company, Cleveland, Ohio, manufacturer of Royal electric cleaners, announced recently that for the third successive year the Pacific Coast captured highest honors in the annual sales contest conducted by the company, four of the first five contestants being Californians, and twenty of the first fifty being located in California, Washington and Oregon. Credit for this fine showing is accorded largely to Listenwalter & Gough, Los Angeles, Calif., jobbers for the manufacturer.

The Pacific Electrical Construction Company, San Francisco, Calif., was recently awarded the electrical contract on the new Alamo school to be erected in that city.

The Wagner Electric Corporation, St. Louis, Mo., has recently published a well illustrated bulletin, No. 140, on its line of transformers.

Curtis Lighting, Inc., of California, has been organized to handle the business of **Curtis Lighting, Inc.,** of Chicago, Ill., in California. Mr. Curtis, president of the Chicago company, will be president of the California company, and F. S. Mills will be vice-president and general manager. The new company has opened a studio at 3113 West Sixth Street, Los Angeles.

Packard Electric Company, Warren, Ohio, announces the completion of the designing of a full new line of steel cases for distribution transformers. The use of cast iron cases has been discontinued by this company, and all shipments are being made in the new cases. In addition to a complete line of distribution transformers, the Packard Company manufactures power transformers up to a capacity of 10,000 kva. and a full line of weatherproof metering transformers.

R. R. Rose has purchased the business of the Fox Electric Company, Oceanside, Calif., and has opened a new store under the firm name of the Rose Electric Company, at Second and Freeman Streets. Mr. Rose will increase the appliance stock and, in addition to general electrical contracting, will specialize on industrial work.